Dräger

Incubator 8000 IC

Instructions for Use
– Software 21.n –

1-503-94

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For Your Safety and that of Your Patients

For correct and effective use of the apparatus and to avoid hazards it is essential to read the following recommendations and to act accordingly[1]:

Strictly follow the Instructions for Use

Any use of the apparatus requires full understanding and strict observation of these instructions. The apparatus is only to be used for purposes specified here.

Maintenance

The apparatus must be inspected[2] and serviced[2] regularly by trained service personnel at six monthly intervals (and a record kept).
Repair[2] and general overhaul of the apparatus may only be carried out by trained service personnel.
We recommend that a service contract be obtained with DrägerService and that all repairs also be carried out by them. Only authentic Dräger spare parts may be used for maintenance[2].
Observe chapter "Maintenance Intervals".

Power connection

The apparatus is to be used only in rooms with mains power supply installations complying with national safety standards (such as in F. R. of Germany: VDE 0107).

The requirements laid down in IEC 601-1 "Safety of Medical Electrical Equipment" are applicable for electrically powered equipment.

Not for use in areas of explosion hazard

This apparatus is neither approved nor certified for use in areas where combustible or explosive gas mixtures are likely to occur.

Safe connection with other electrical equipment

Electrical connections to equipment which is not listed in these Instructions for Use should only be made following consultations with the respective manufacturers or an expert.

Liability for proper function or damage

The liability for the proper function of the apparatus is irrevocably transferred to the owner or operator to the extent that the apparatus is serviced or repaired by personnel not employed or authorized by DrägerService or if the apparatus is used in a manner not conforming to its intended use.

Dräger Medizintechnik GmbH cannot be held responsible for damage caused by non-compliance with the recommendations given above. The warranty and liability provisions of the terms of sale and delivery of Dräger Medizintechnik GmbH are likewise not modified by the recommendations given above.

Dräger Medizintechnik GmbH

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1)
Insofar as reference is made to laws, regulations or standards, these are based on the legal system of the Federal Republic of Germany.

2)
Definitions according to DIN 31 051:

Inspection	= examination of actual condition
Service	= measures to maintain specified condition
Repair	= measures to restore specified condition
Maintenance	= inspection, service, repair

Intended Use

Intensive care for premature babies with a body weight of less than 1500 g and for sick neonates.

With control for:
- air temperature
- relative humidity
- O_2 concentration
- skin temperature (optional)

The incubator must only be used by properly trained staff under the supervision of qualified medical staff who have up-to-date knowledge of the risks and benefits of the use of incubators.

Do not use the skin temperature control on babies who are in shock or who have high temperatures.

The air in the incubator should only be enriched with oxygen when prescribed by a doctor. It is absolutely essential that such oxygen enrichment is controlled on the basis of the arterially-measured oxygen partial pressure in the patient's blood. If this is not done there is a risk of hyperoxaemia (damage to the eyes) and hypoxaemia (damage to the brain).

Do not nebulize any medicaments or similar substances in the patient's room. If nebulized substances fall onto the incubator this may impair its functioning.

Mobile telephones must not be used within 10 metres of the incubator.
Mobile telephones may interfere with the functioning of electro-medical equipment.

Only connect incubator to a mains power socket. Do not use a mains distribution board.
If there is a circuit breaker in the supply to the distribution board the permitted limit for leakage currents might be exceeded. There could then be an electrical risk for patient and staff.

Maximum load must not exceed 25 kg.

Preparation

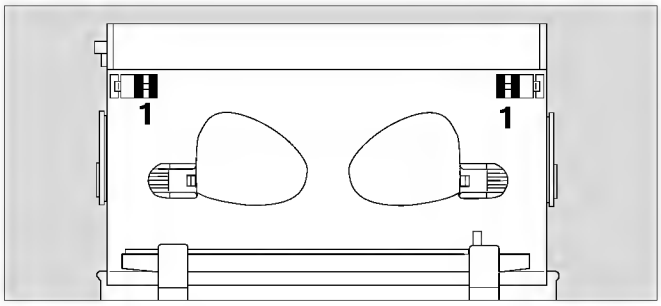
The incubator is supplied fully assembled.

Before using for the first time

- Check that all packaging material has been removed.

Doors, ports and bed

Front door



To open front door:

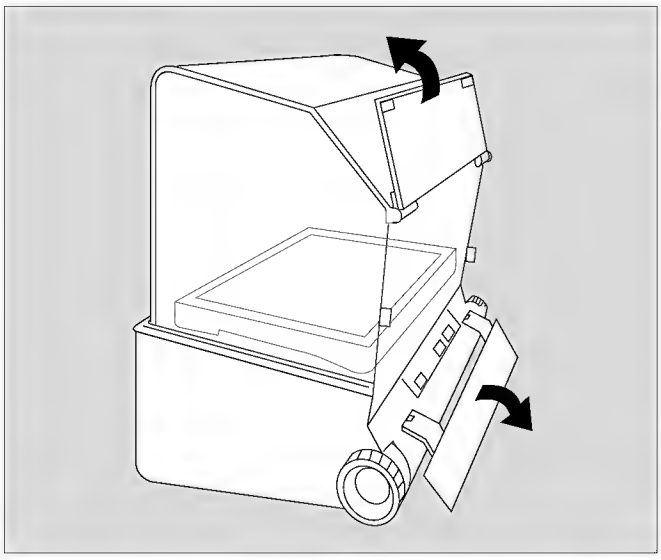
1 Squeeze catches together with thumb and index finger and at the same time lower front door until it rests on housing.

To close front door:

- Lift up front door.

1 Squeeze catches together on both sides, push front door forward and release catches. Push firmly on front door to ensure that catches fully engage. Red mark on catches should no longer be visible.

Divided front door, optional



To open front door:

- Squeeze catches on both sides together, and at the same time fold upper section back until it rests on sloping surface of canopy. It is then possible to attend to the patient.

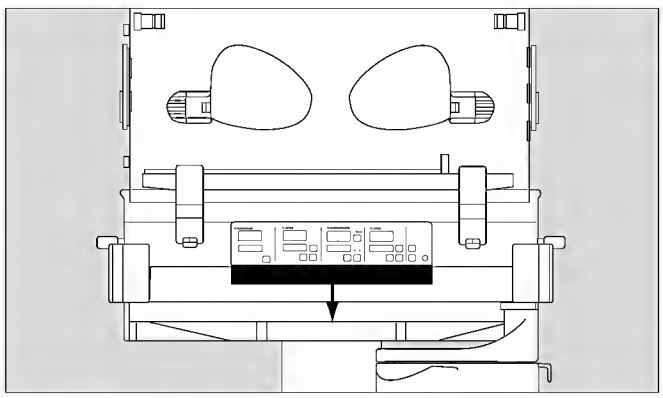
If necessary:

- Pull lower section down, pulling gently against pivots to do so, and lower until it rests on housing.

To close front door:

- First lift up lower section and push back into place – until it engages.
- Then fold upper section down and, while squeezing catches on both sides together, push door back into place – until it engages.
  Red mark on catch should not be visible any more.

Flap with Brief Instructions



- Fold flap down when:

– switching on incubator,

– entering or confirming set values

Then

- Fold flap back up again to prevent set values being altered accidentally.

To switch off repeated alarm sound when flap is folded up:

- Press [🔕] key on flap.

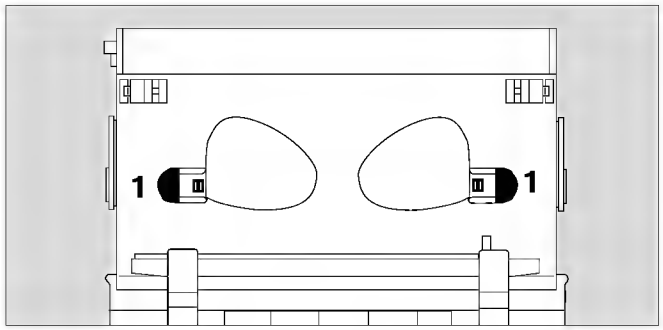
Hand ports

To open hand ports:

1 Press catch on serrated area to open hand port.

To close hand ports:

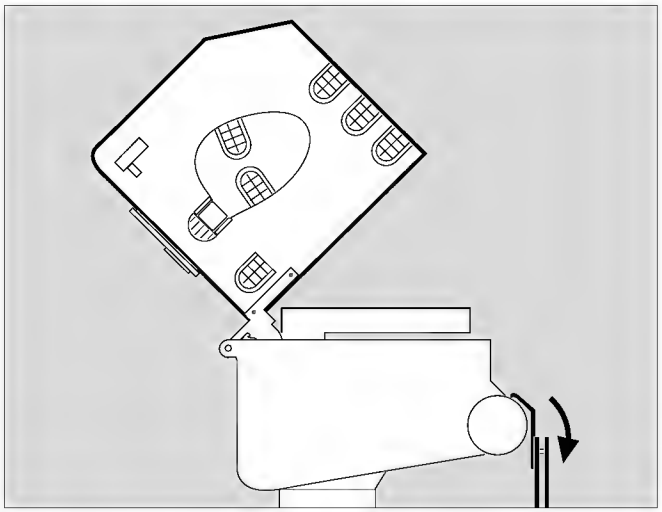
- Push hand ports back into place until catch is safely engaged.



Canopy

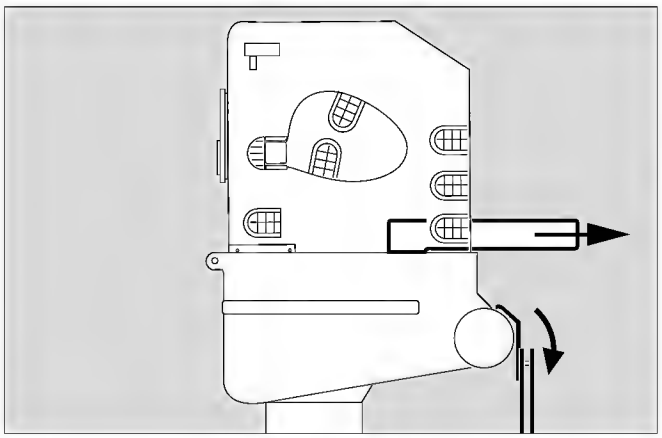
To lift up canopy:

- Open front door.
- Tip canopy back as far as it goes.



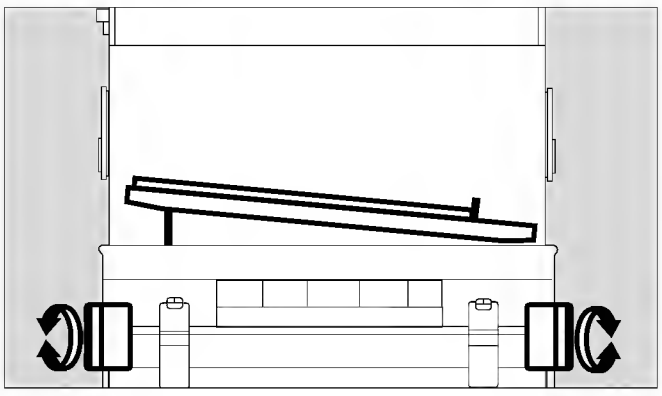
Taking out the bed

- Open front door.
- Pull bed out forwards as far as it goes.
- After completing care procedure, push bed back as far as it will go and close front door.



Tilting the bed

- Turn left handwheel to lift left end of bed.
- Turn right handwheel to lift right end of bed.



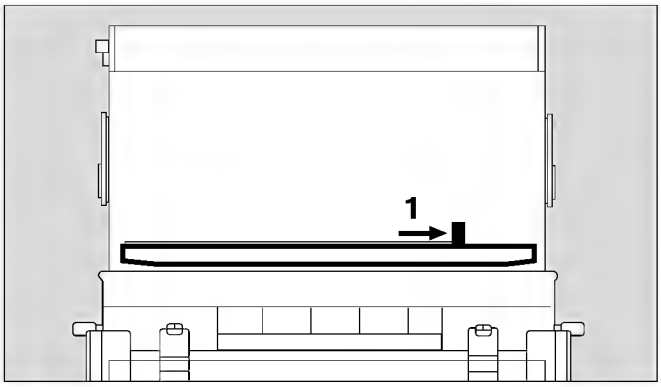
Re-positioning bed end

Can be used at right or left end of bed, as required.

- Open front door.

1 Push middle of bed end outwards until it is released from the groove and

- re-position at other end of bed.
- Close front door.



Replacing double walls

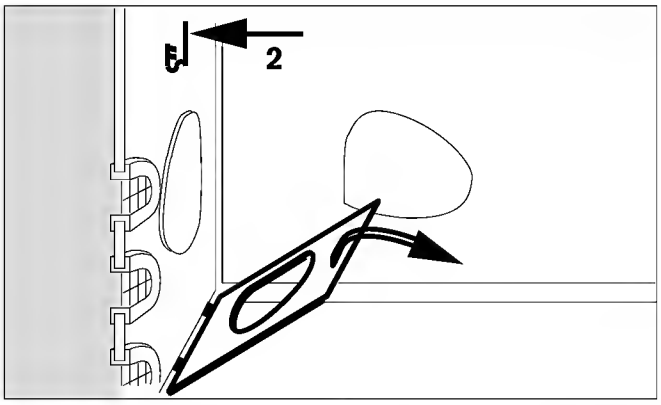
Left side wall and front door

e.g. when cleaning the incubator

- Open front door.

2 Disengage double wall from upper bracket and fold down.

- After cleaning refit the double wall by gently folding back up until it engages again; close the front door.



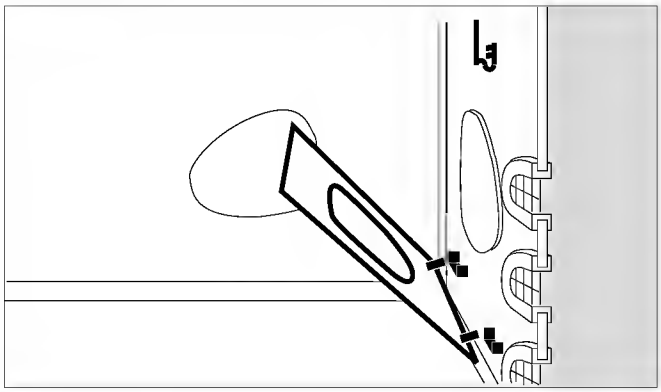
Removable double walls

When larger babies are being treated, their greater heat production may cause the incubator temperature to rise, and, if so, the double walls should be removed.

- Open front door.
- Disengage double walls from upper bracket and remove.

To put back:

- Fit double wall to clips provided, raise and
- engage in upper bracket.
- Close front door.



Bed extension

Required when the rear double wall is not being used to reduce risk of patient being trapped.

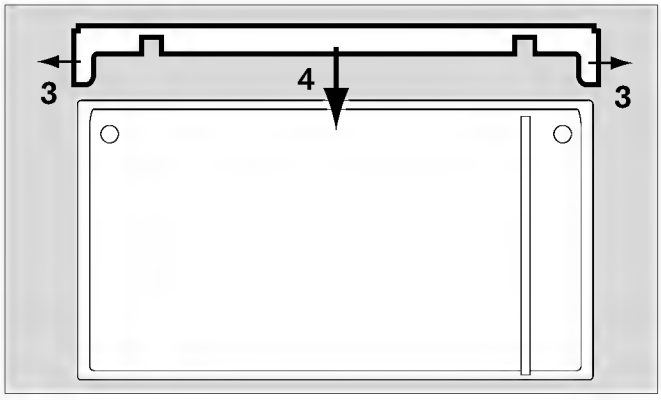
- Open front door and pull out bed.

3 Push both ends of bed extension out slightly and

4 click on the rear side of the bed.
Make sure that the bed extension is securely atteched.

- Replace bed in incubator.

Do **not** use bed extension when the rear double wall is in place as the incubator temperature may be affected.



Adjusting working height

- Connect to mains power supply.

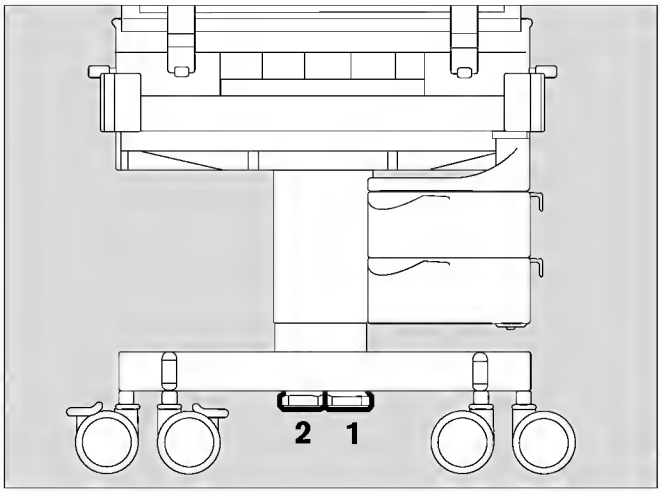
1 Press right foot pedal to raise incubator.

2 Press left foot pedal to lower incubator.

- Adjust to comfortable working height.

Hoses and cables must be the right length so that they do not kink, tear or become squashed.

Do not store anything under the swivel cupboard.

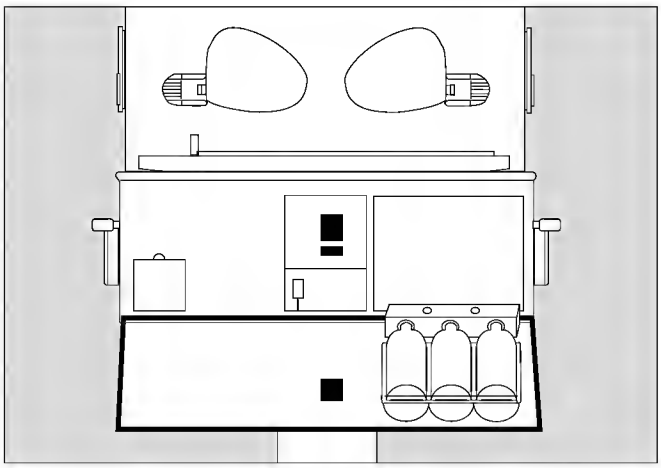


Folding down back panel

- Disengage back panel and fold down.

For instance, in order to
replace water bottles,
replace filter
connect climate sensor

- Lift back panel up again and engage catch.



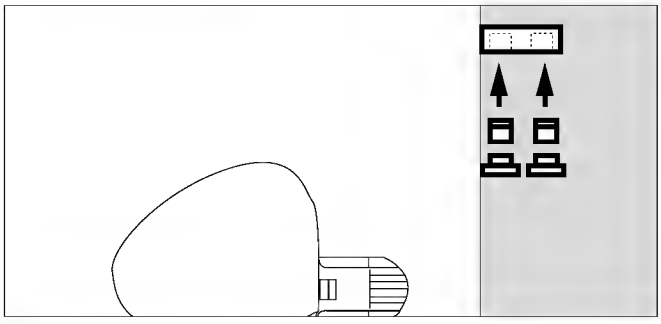
Connecting climate sensor

The climate sensor measures
air temperature
relative humidity and
O_2 concentration

- Pull climate sensor out and take off.
- Unscrew retaining ring, fit O_2 sensor capsule and then screw retaining ring back into position.

⚠ Use two O_2 sensor capsules with the same expiry date. Only use Dräger original sensor capsules. See Order List on page 57.

- Refit climate sensor and push back into place.

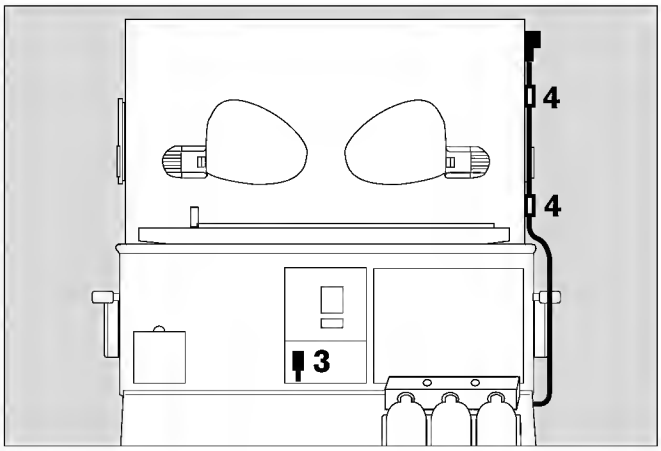


- Disengage back panel and fold down.
- Push sensor plug through slot between incubator housing and back panel, from below.

3 Connect sensor plug to socket and screw safety screws on firmly.

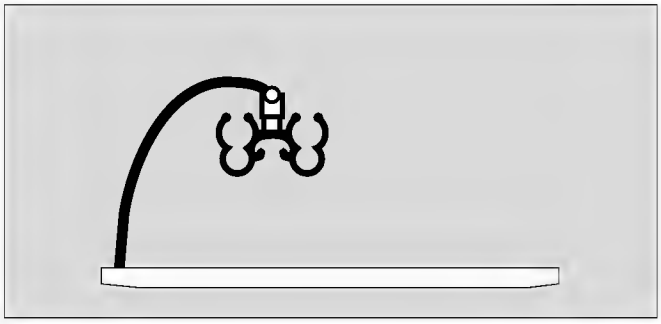
4 Route sensor cable through cable clips.

- Lift back panel up again and engage.



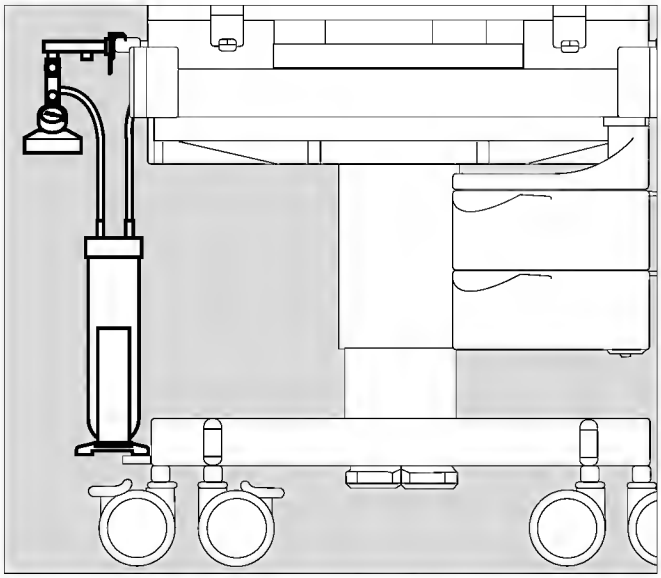
Fitting accessories

Support for ventilation hoses



- Fold down front door.
- Raise bed and lift out of incubator.
- Push mattress to one side a little.
  Push hose support into appropriate hole, right or left.
- Screw knurled screws on from below and tighten.
- Replace bed in the incubator and close front door.

Bronchial suction equipment

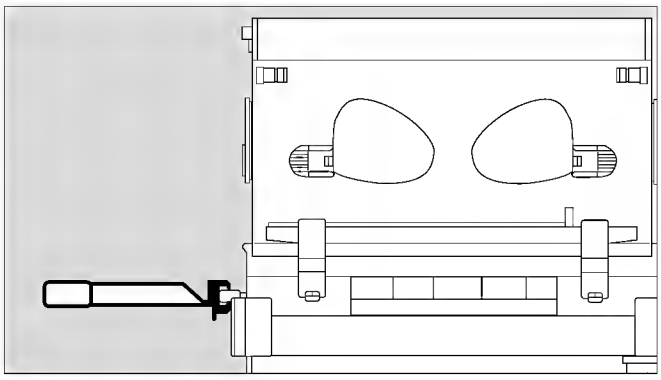


See also relevant Instructions for Use.

To mount on incubator

- Screw holder to left or right end face of trolley at front, using holes provided.
- Hang bottle holder on it.
- Attach ejector to rail with rail clamp.
- Connect hose.

Instrument tray



(for small items)

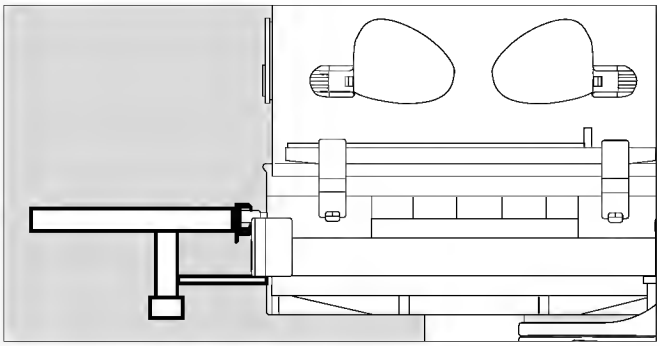
- Attach tray to rail and tighten clamp.
  Maximum load must not exceed 2 kg.

Mounting plate

For monitors and ventilators with latching system for standard Dräger housings 1/2B, e.g. Babylog 8000.

Maximum load must not exceed 20 kg.

- Attach plate to rail and tighten clamp.

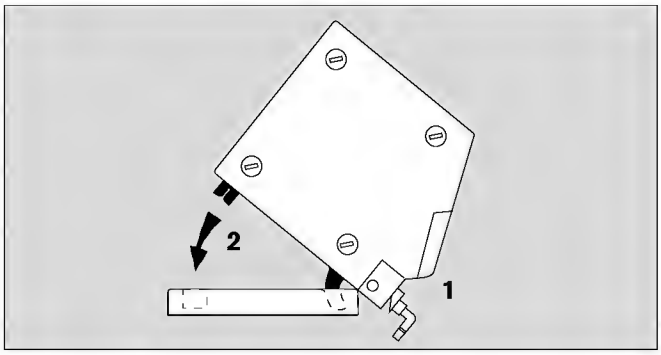


Fixing equipment to mounting plate
Example: Babylog 8000

- Remove foot strips from Babylog.
- Tilt Babylog forward by about 45° .

1 Insert front latches into slots in mounting plate.

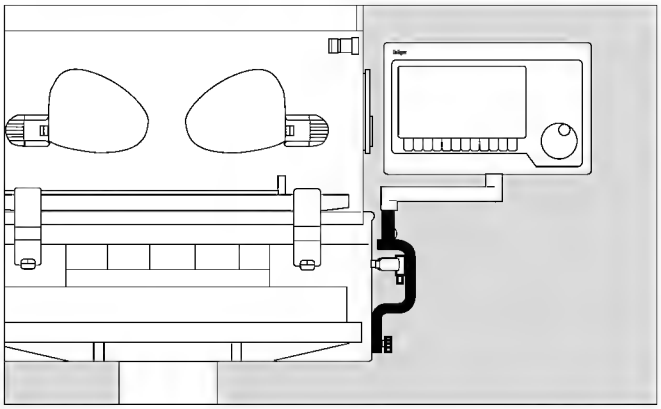
2 Lower Babylog, insert the rear latches into slots in mounting plate and secure at back with knurled screws.



BabyScreen

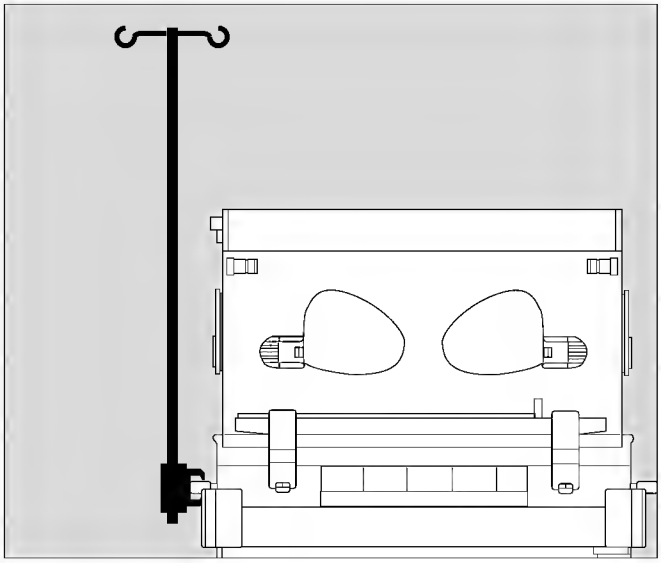
Optional for ThermoMonitoring

- Attach holder to rail.
- Engage BabyScreen in holder.
- Follow relevant assembly instructions.



Infusion stand

- Attach stand to rail with rail clamp and tighten.

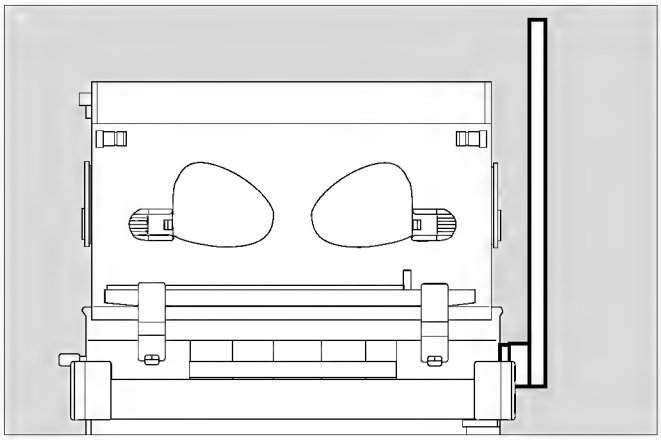


Fitting pillar

For mounting accessories, such as
infusion pumps
instrument trays
infusion stand

- Fit according to assembly instructions.

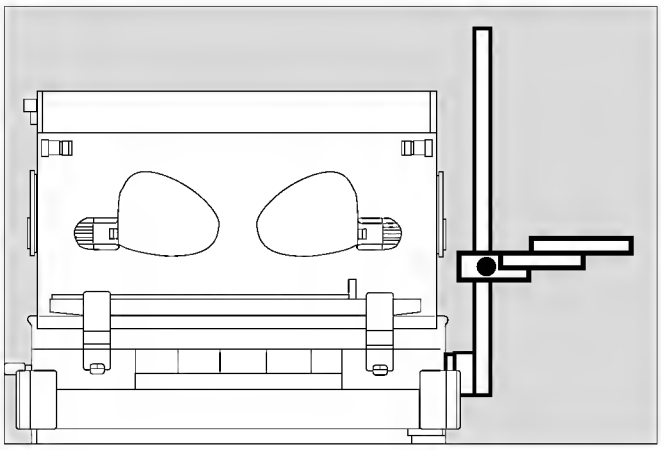
Set to low working height before transport.



Swivel table

For small items, maximum load 3 kg

- Attach clamp on swivel table to pillar and tighten screw.
  Make sure that swivelling area is clear.



Swivel cupboard

To move swivel cupboard on right of incubator to left

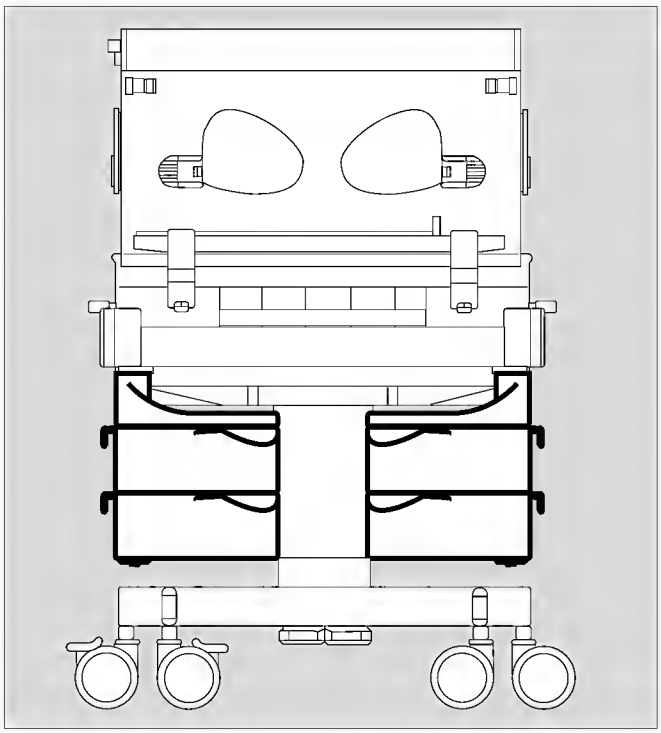
or

to fit an additional swivel cupboard:

- Push Allen screw up through unit from below and screw firmly to unit mounting.
- Insert extra trays.
- Store whatever is needed in them.

Do not store anything under the swivel cupboard.

The maximum load on the incubator must not exceed 25 kg.

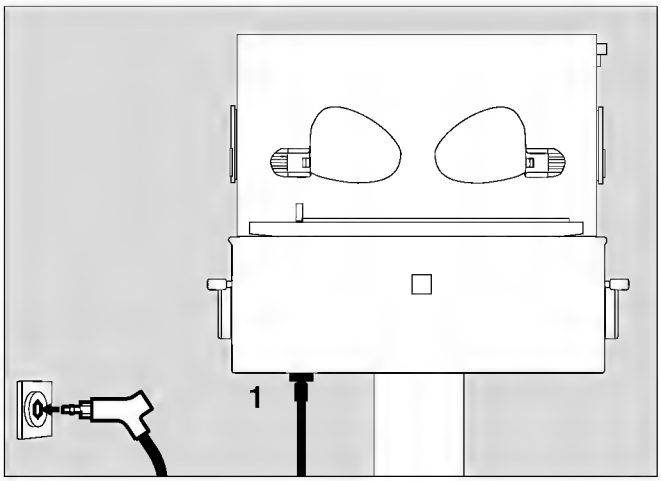


Preparing oxygen therapy accessories

Oxygen enrichment of incubator air with oxygen control

1 Screw O_2 connecting hose underneath incubator.

- Connect probe to terminal of medical gas pipeline O_2 supply in "parking position".



Oxygen enrichment without O_2 control

If oxygen control module is faulty

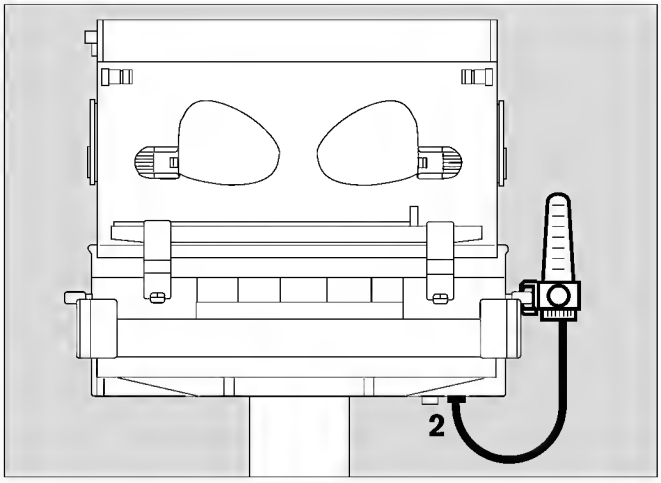
- Follow Instructions for Use of equipment being used.
- **Monitor O_2 concentration.**

O_2 flowmeter

- Attach O_2 flowmeter to rail.
- Fit hose to connector on O_2 flowmeter and

2 to O_2 connector underneath incubator.

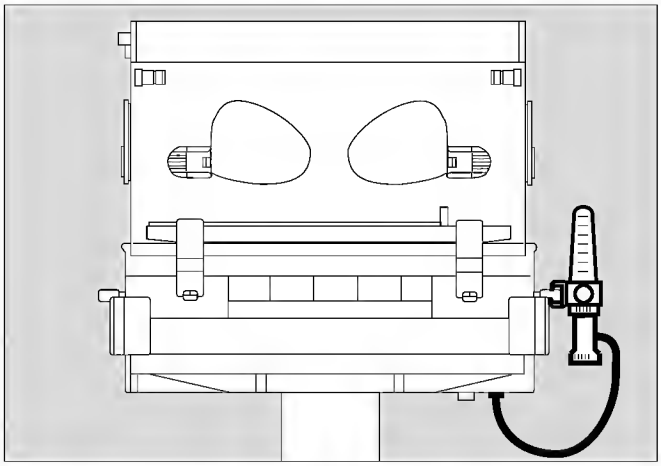
- Push probe on O_2 connecting hose into the medical gas terminal unit, only as far as "parking position" initially.



Oxygen limiter

If an oxygen limiter is going to be used:

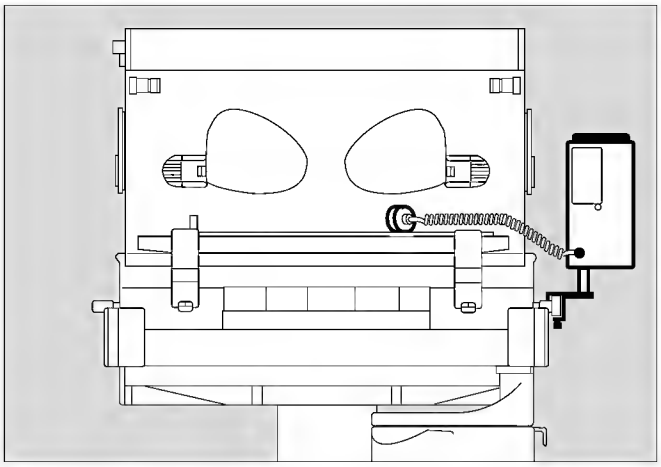
- Unscrew connector on O_2 flowmeter and screw oxygen limiter on.
- Connect hose.



O_2 meter

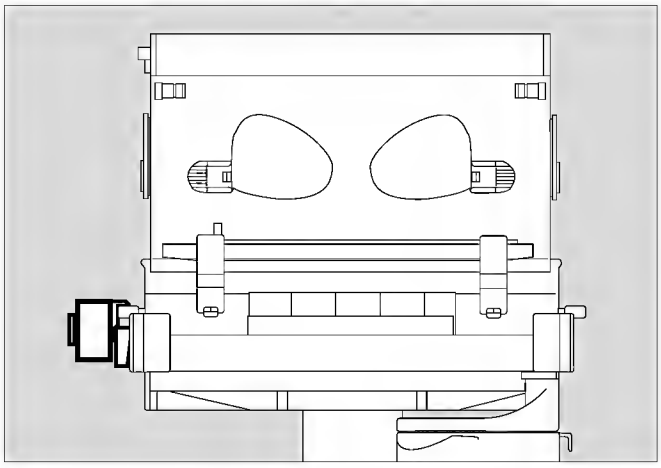
Monitor O_2 concentration with O_2 meter which has alarm limits, e.g. Dräger Oxydig:

- Attach O_2 Oxydig meter to rail with meter bracket.
- Place sensor capsule in incubator.
- Route sensor cable through one of the flexible hose seals. Push sensor plug into socket on Oxydig until it clicks into place.



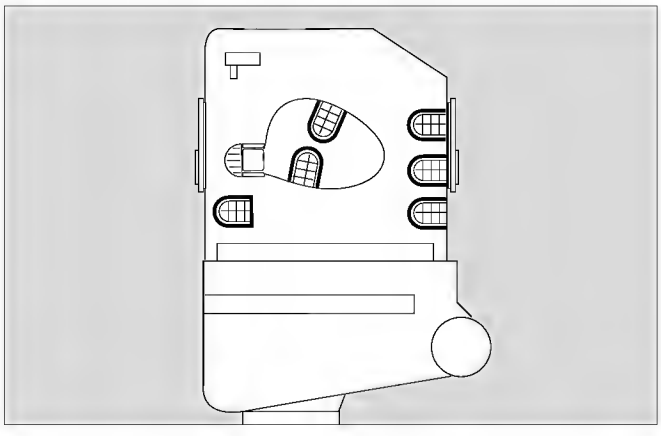
Oxygen distributor

- Attach oxygen distributor, order no. 2M 18 810, to rail.

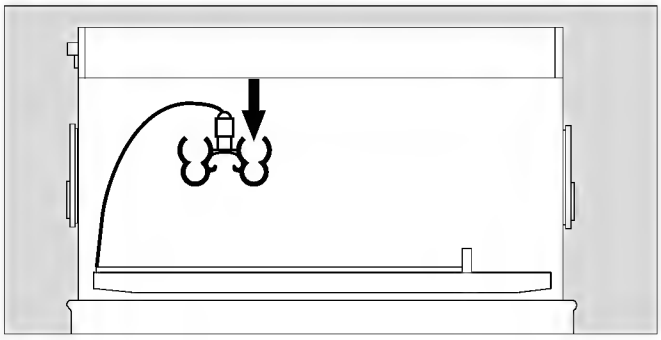


Routing cables and hoses

- Route hoses and cables through the flexible hose seals.



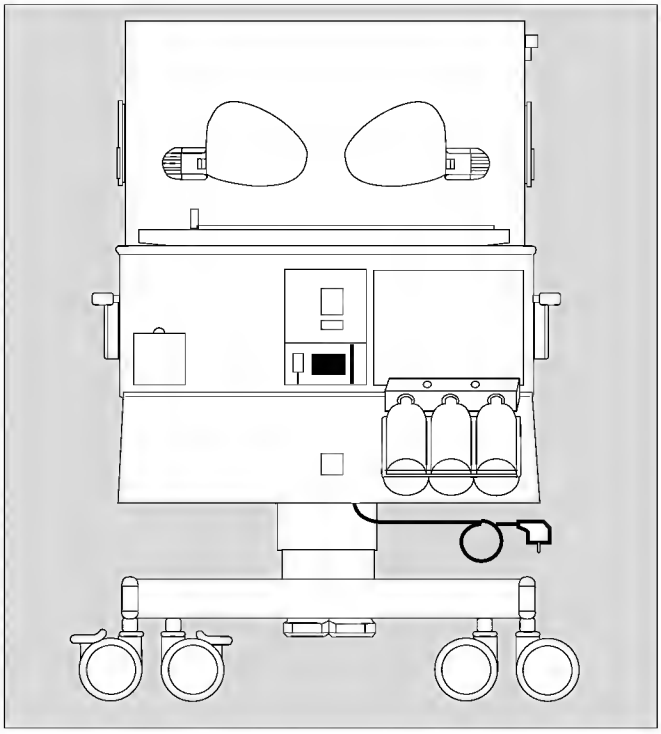
- Push ventilation hoses and cables into clip at end of hose support.



Checking Readiness for Operation

Before using for the first time

- Check that the mains voltage corresponds to the specification on the rating plate.



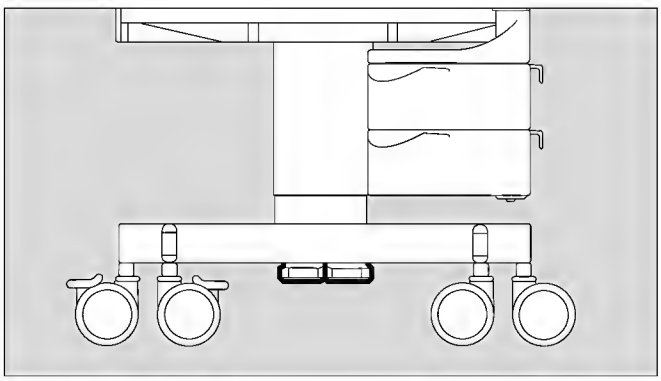
Before each use

- Check that the equipment has been disinfected.
- Check that the calibration seals on the front of the equipment and on the skin temperature sensor are still valid (only required in Germany).
- Check that an adequate gas supply is available for the equipment to be used.
- Check that the accessories and therapy equipment required are to hand and in perfect condition. Check readiness for operation in accordance with relevant Instructions for Use.
- Check that the incubator canopy has no cracks or sharp, chipped edges.
- Check that the hinges and catches on the canopy are in proper working order.
- Check that the cables and hoses are routed correctly and safely.
- Check that two O_2 sensor capsules are installed.
- If the rear double wall has been removed: Check that the bed extension is provided. See page 7.
- Connect to mains power supply.

⚠ **Do not use a mains distribution board.**
If there is a protective circuit breaker in the supply to the mains distribution board, the permitted limit value for leakage currents might be exceeded. There could then be an electrical risk for patient and staff.

Checking height adjustment

- Press both foot pedals, one after the other, to raise and lower incubator.
  Then adjust to comfortable working height.



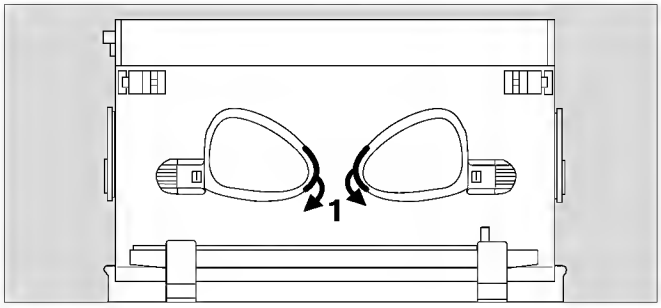
Checking that hand ports will stay closed

- Open each hand port and then close carefully until catch engages.

1 Grip rim of closed hand port and pull outwards – it should not open.

If the hand port does not remain engaged:

- Call DrägerService.



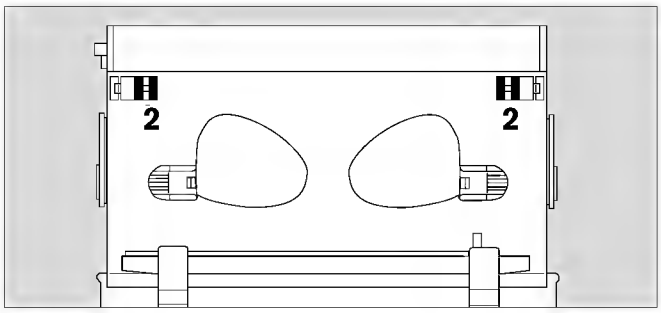
Checking that front door will stay closed

- Open front door.
- Lift up front door again.

2 Squeeze catches together on both sides, push front door forward and release catches. Push firmly on front door to ensure that catches fully engage. Red mark on catches should no longer be visible.

If the front door does not engage:

- Call DrägerService.



Checking air filter

- Fold down back panel.

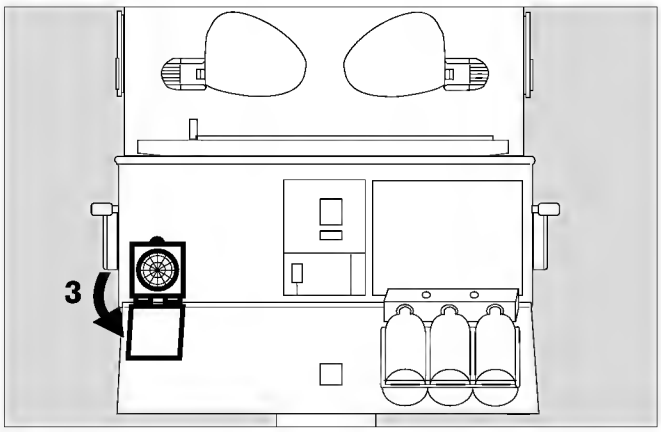
3 Open filter cover plate downwards.

If a filter is fitted:

- Remove filter and check fitting date; label is on edge of filter.

If filter is more than 2 months old:

- Replace with a new filter.
- Write fitting date on new filter label and stick to edge of filter.
- Press filter firmly into the seal.
  Make sure that the direction of flow through filter is correct. Arrow on filter has to point into incubator.
- Close cover plate and lift back panel up again.



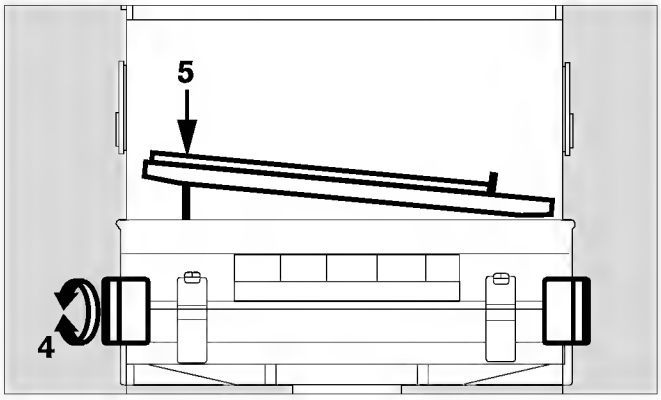
Testing tilting mechanism for bed

4 Raise left end of bed to maximum height.

5 Push down on raised bed with hand – bed must not drop down.

If bed does drop down:

- Call DrägerService.
- Check tilting mechanism at right end of bed in the same way.



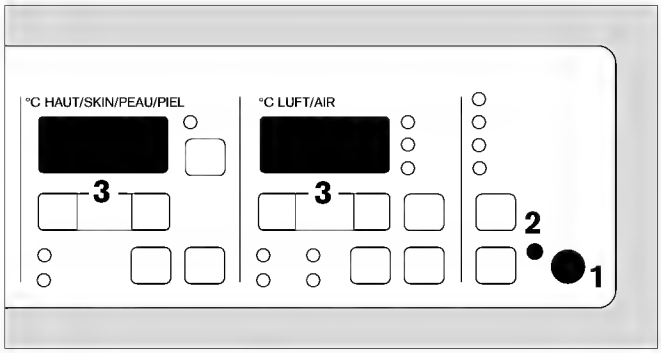
Activating incubator self-test

- Fold down flap with brief instructions.

1 Push on / off switch in – until it engages = on.
Functioning of incubator is self-tested.

2 Green LED is lit.

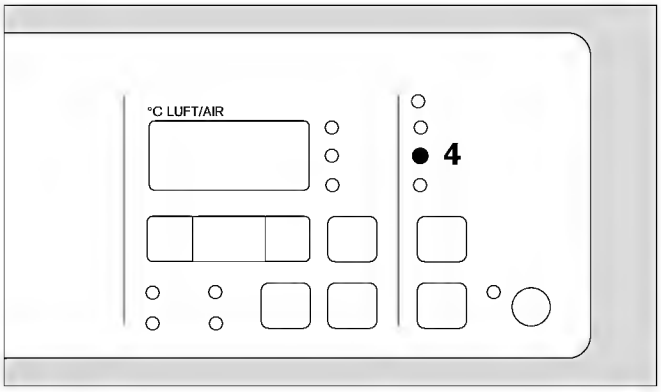
3 Display of actual values shows dashes.
If **Err** is displayed = error, see p. 41 to 45.



Checking mains power failure alarm and NiCd batteries

- Disconnect from mains.

4 Red ⊕ LED is lit. Continuous sound commences.
The volume should remain constant for at least 30 seconds.



If the volume decreases too soon:

- Leave incubator connected to mains and switched on for 24 hours for the NiCd battery to be charged.
- Repeat check.

If volume decreases too soon again:

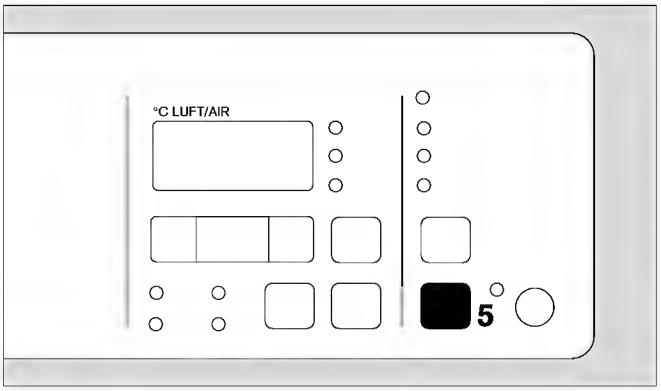
- Call DrägerService.

Checking LEDs, displays and alarm sound

5 Press Check key:
For about 2 seconds – all LEDs are lit (except the mains power failure LED), the digital displays show **88.8** and alarm sound commences.

Thereafter, displays and LEDs go dark and alarm sound ceases. After approximately another 2 seconds the original displays for measured and set values re-appear.

This check may also be carried out during operation.



- Check at least once daily.

If there is a fault:

- Call DrägerService.

The incubator is ready for operation when all checks have been carried out successfully.

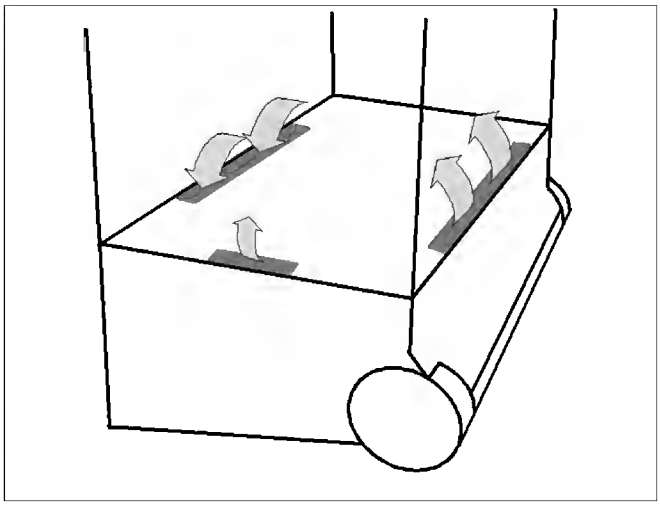
Operation

Precautions

Warming-up time

Allow adequate time for warming-up before placing the baby in the incubator (about 35 minutes).
Recommendation: keep incubator in standby,
see p.19.

Do not cover air stream channels in base plate: Danger of burning or cooling patient.



Covering control panel

The control panel is covered with a flap to prevent set values being altered accidentally. To switch on the incubator, change set values or identify alarms, fold down flap.
Then fold flap back up again.

Controlling temperature of incubator

- Temperature may be increased very rapidly when required because of high heating power.
- Temperature drops slowly because of good thermal insulation.

Additional external heat sources, such as sunlight, heat lamps, spotlamps, electric cushions should be avoided. These increase the air temperature inside the incubator in an uncontrolled manner.

Setting air temperature of incubator

The baby experiences minimal heat loss

- by convection because of low air speed across bed
- by conduction through the mattress
- by evaporation because of high humidity setting in incubator
- by radiation when double walls are fitted.

Therefore,
compared with other incubators, such as the Incubator 6000 or 7000, a lower incubator air temperature can be set.

The baby's core temperature must be monitored continually, particularly during the first few hours of incubator care.

Reducing the internal temperature of the incubator

The cooling time is dependent on the design and can be accelerated by:

- reducing the outside temperature (when possible)
- reducing the air-humidity setting.

The rate of cooling is **not** accelerated by:

- setting the air temperature to a lower value than is actually required.

In **urgent** cases: open front door or hand ports. When front door is opened, there must be **continuous** supervision to make sure that the baby does not fall out.

When older babies are being treated, their greater heat production may cause the incubator temperature to rise, and, if so, the double walls should be removed.

Fire risk from oxygen

- No naked lights or smoking. Textiles, oil and plastics can very easily catch fire and burn rapidly in an oxygen-enriched atmosphere.
- Keep all fittings and seals in contact with oxygen free of oil and grease.
- Open valves on O_2 cylinders slowly.
- Do not use an incubator where there are flammable anaesthetic gases or disinfection agents. Risk of explosion.
- Do not use or keep flammable liquids, such as alcohol, ether and acetone in the incubator.
- Do not use any electrical equipment inside the incubator, except, that is, for equipment expressly designed for use in areas where there is a risk of explosion.

Physiological risks from oxygen

The air in the incubator should only be enriched with oxygen when prescribed by a doctor. It is absolutely essential that such oxygen enrichment is controlled on the basis of the arterially-measured oxygen partial pressure in the blood of the patient. This is the only way of avoiding both hyperoxaemia (damage to the eyes) and hypoxaemia (damage to the brain).

Temperature of breathing gas

During ventilation the breathing-gas hoses may be additionally heated by the heated air circulating in the incubator. The temperature of the breathing gas must be monitored.

Phototherapy in the incubator

Absorption of light through the baby's skin will supply heat which may increase the baby's core temperature.

Therefore,

- Decrease temperature setting for incubator air by about 2 °C 15 minutes before phototherapy.
- Decrease the set value for humidity.
- Reduce the room temperature to at least 3 °C below the air temperature of the incubator.
  This value applies for Dräger Photo-Therapy 800/8000/4000.
  Other phototherapy units, particularly those without a built-in fan, may cause even greater heating of the incubator.

The core temperature of the baby must be monitored with particular care during phototherapy.

The supply of fluids to the baby must be increased e. g. by parenteral infusion, **in order to compensate for increased loss of water during phototherapy.**

The phototherapy lamp and incubator canopy must not be covered with cloths, aluminium foil, or other materials, to boost the photo-therapeutic effect. **Risk of heat build-up**. The incubator could not then be adequately cooled with ambient air.
Danger of overheating the patient.

Preventing high noise levels

Noise levels that are too high for the patient may be caused by:

- using head boxes to deliver pressurised gas,
- wear on the bearings of the fan motor,
- placing objects on the incubator canopy.

- Observe maintenance intervals, p. 46.
- Do not place anything on the incubator canopy.

Electrical safety

Use only electro-medical ancillary equipment which complies with the IEC 601-1, EN 60601-1 or DIN VDE 0750, part 1, regulations.

Wait for warming-up time.
Wait for about 35 minutes before use.

- Heat incubator in "air temperature control" operating mode.

If incubator has to be used urgently, operate in **standby** mode:

- Set air temperature to **32 °C to 36 °C**, see p.20.
- Oxygen control off, see p.33.
- Humidity control off, see p.30.

Just before placing the baby in the incubator:

Fill water bottles

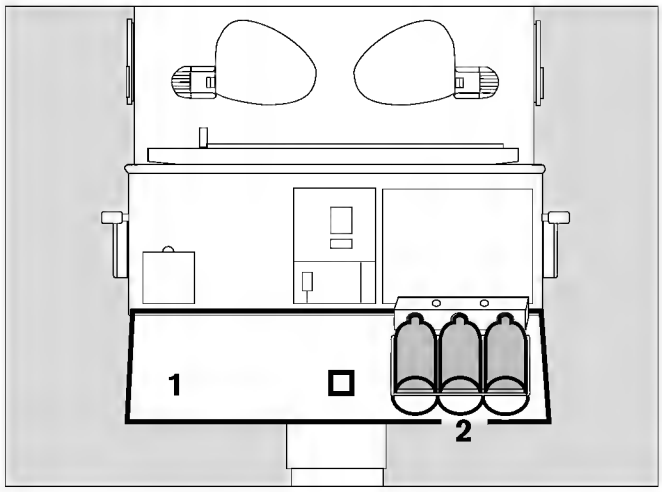
- If required use protective gloves.

1 Open back panel and fold down.

2 Disconnect empty water bottles and refill with 500 mL clean, distilled or demineralised water (hospital dispensary). Do not use any additives.

- Refit filled water bottles and close back panel again.
- Then disinfect hands.

Use
– DIN 58363-IL 500-FL-BK1 or
– ISO 8536-1-IL 500-CL-HC1 Form A,
infusion bottles only.



If a water container is used:

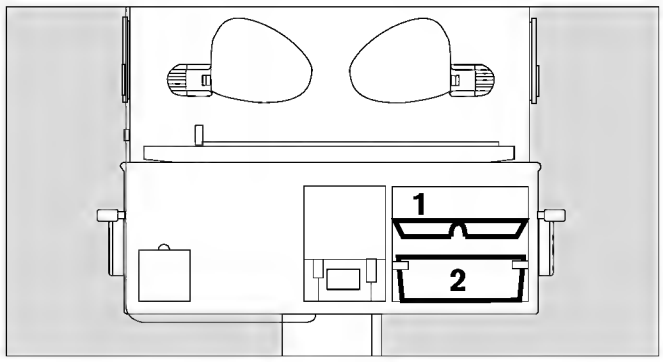
Fill water container

- If required use protective gloves.

1 Take cover of water container off and

2 fill container to mark with clean, distilled or demineralised water (hospital dispensary). Do not use any additives. Take care not to overfill.

- Put cover of water container back.
- Then disinfect hands.



Placing baby in the incubator

- Open front door and pull out bed.
- Put the baby on the bed and slide the bed back in position.
- Close the front door and check that the catches are properly engaged.
- Adjust the bed as required.

Adjusting working height

- Adjust working height, as required, see p. 8.

Controlling air temperature

Measure the patient's core temperature at regular intervals.

- Fold down flap with brief instructions.

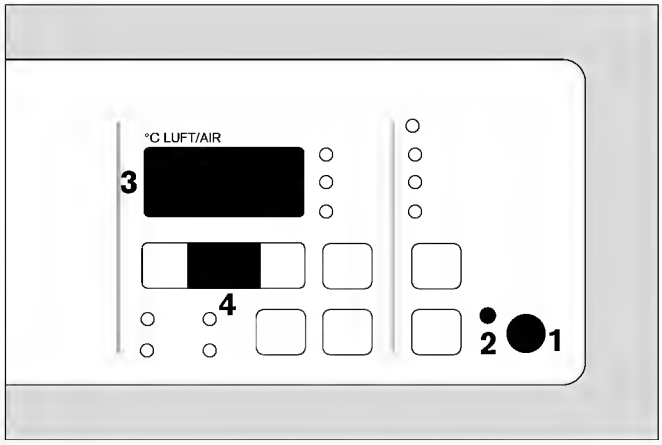
1 Push on / off switch in – until it engages = on.

2 Green LED is lit.

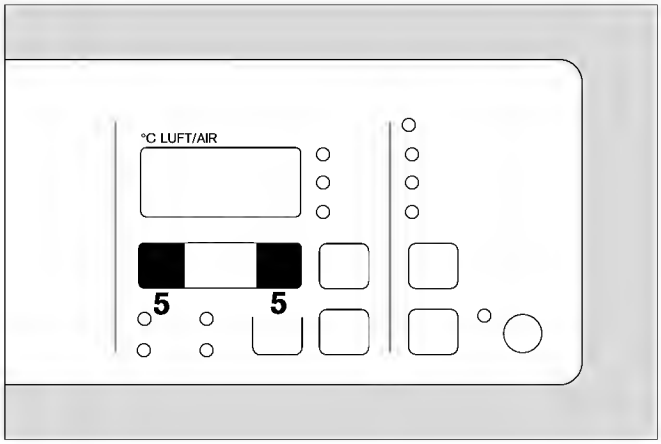
- Wait for self-test to finish, then incubator will switch to "air temperature control" mode.

3 The display alternates regularly between measured value for air temperature and the word, **SEt**.

4 Default value for flashing display of air temperature set value is **33.0 °C**.



5 Press ↑ or ↓ key briefly to select this set value. The display will remain continuously lit.



Setting values in 28 °C to 37 °C range

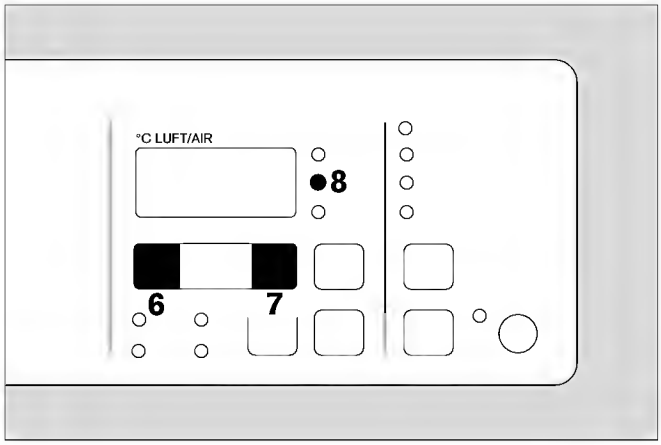
The set value can be changed in 0.1 °C steps.

6 Press ↓ key – the set value is decreased,

7 Press ↑ key – the set value is increased.

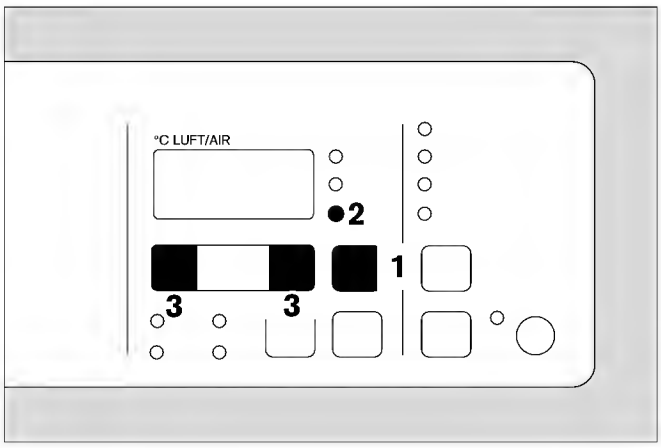
- Press ↑ or ↓ key until the set value required is reached.

8 While green LED flashes – incubator is in heating-up phase.



Extending range of set values from 37 °C to 39 °C

Only do this if prescribed by a doctor.
The patient's core temperature must be monitored very carefully.



1 Press unlocking key, [>37 °C] ,

2 yellow **>37 °C** control LED is lit.

The alarm limit for high temperature will be increased from 38 °C to 40 °C.

3 Keep [↑] or [↓] key pressed until the value required is displayed.

- Set a value between 37 °C and 39 °C within 1minute.

Otherwise:

– **>37 °C** control LED will go out.

The lock against setting a higher range of values will be in force again.
The alarm limit for high temperature will return to 38 °C again.

If a value below 37 °C is set after the range of values has been extended:

– the extension is automatically cancelled.

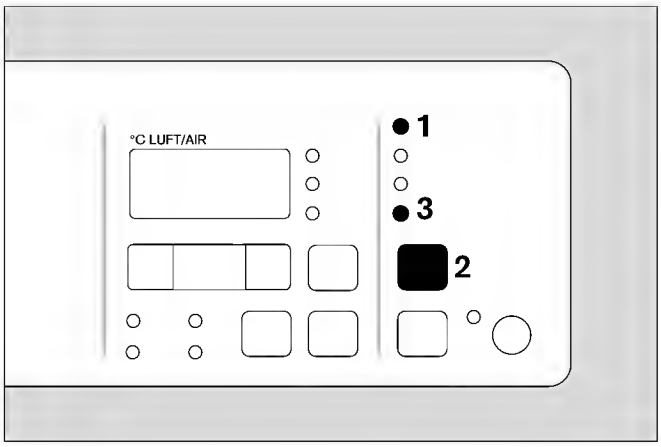
If the actual temperature remains above 38 °C, the high temperature alarm is triggered.

Recommendation to prevent an high temperature alarm:

- Set value to 37.1 °C and wait until incubator has cooled to 37.9 °C ,
- then set value below 37 °C , as required.

Alarms

Central alarm



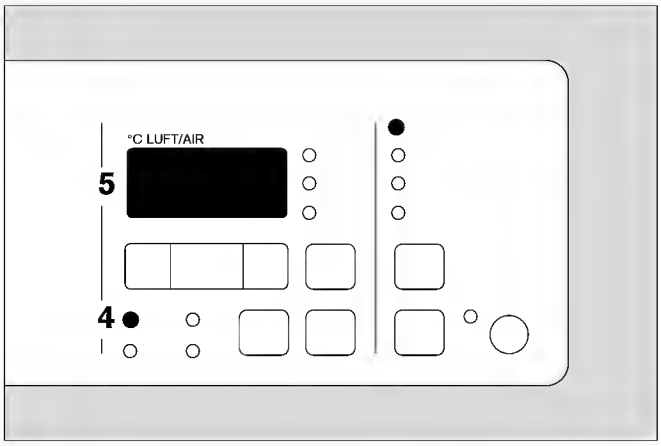
1 Red **Alarm** LED flashes, and an appropriate alarm sound commences.

Alarms with intermittent tone may be suppressed for 10 minutes:

2 Press [🔔] key,

3 yellow 🔔 LED and

1 red **Alarm** LED are lit.



If there is a **deviation of more than ±1.5 °C** between set value for air temperature and measured value:

- Red **Alarm** LED and

4 red **±1.5 °C** LED flash,

5 display flashes and intermittent tone commences. The intermittent tone may be suppressed for 10 minutes:

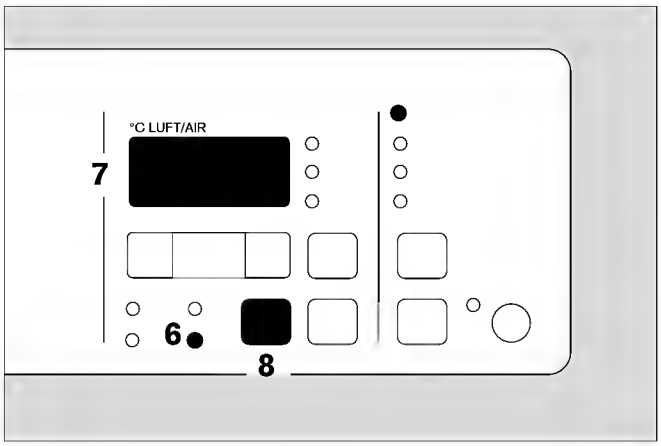
When measured value is again within **±1.5 °C** of temperature set,

- **±1.5 °C** LED and **Alarm** LED go out. The intermittent tone ceases.

When the incubator is switched on the alarm sound is automatically suppressed for 30 minutes during the warming-up phase:

4 red **±1.5 °C** LED and

- yellow 🔔 LED and red **Alarm** LED are lit.



If the **air temperature is above 38 °C**, or above 40 °C for extended range of values,

- red **Alarm** LED and

6 red 🌡 LED flash.

7 Display flashes and intermittent tone commences. The alarm sound may be suppressed for 10 minutes.

When the air temperature has fallen below the alarm limit again:

8 Press [Reset 🌡] key, the alarm is cancelled.

For other alarms, see "Fault, Cause, Remedy", page 41 and 42.

When there is a "skin temperature control" module installed and it is in operation, the "air temperature control" mode can be switched on again:

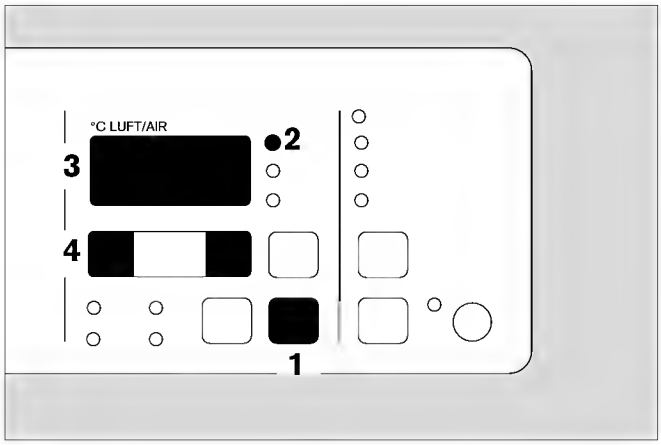
1 Press [Control] key,

2 green **Control** LED is lit.

The "air temperature control" mode is re-activated. The set value for air temperature will be the last value determined by the system.

3 The display alternates between the measured value for air temperature and word **SEt**.

4 Confirm with [↑] or [↓] key and set a new value.



Using skin temperature control

When the skin temperature control option is installed.

Do not use on babies in shock as their skin temperature is well below normal. Using skin temperature control would increase the temperature of the incubator too much.

To control air temperature, see p. 20.

Core temperature must be measured regularly.

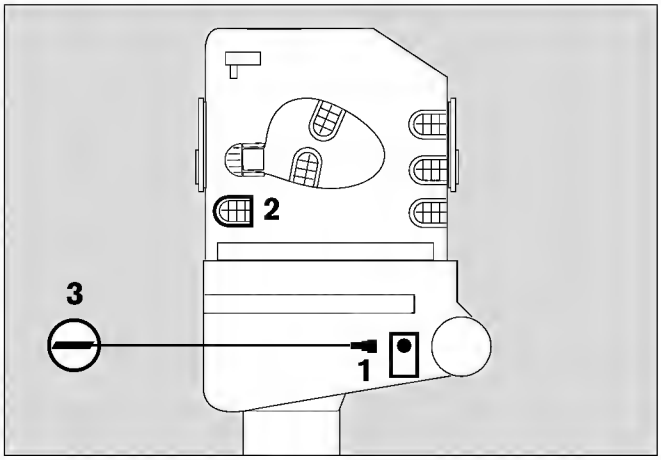
Connecting skin temperature sensor

1 Insert yellow sensor plug into the yellow socket on left side of housing.

2 Route sensor cable through one of the flexible hose seals in the canopy.

3 Remove protective foil from adhesive pad and place skin temperature sensor on pad.

- Using the adhesive pad, attach sensor tip to the infant's skin where the temperature is to be measured.
- Keep sensor cable in place with adhesive plaster.



Placing sensor

If the baby is lying on its back:

- Attach sensor to the abdomen in the region of the liver.

If the baby is lying on its stomach:

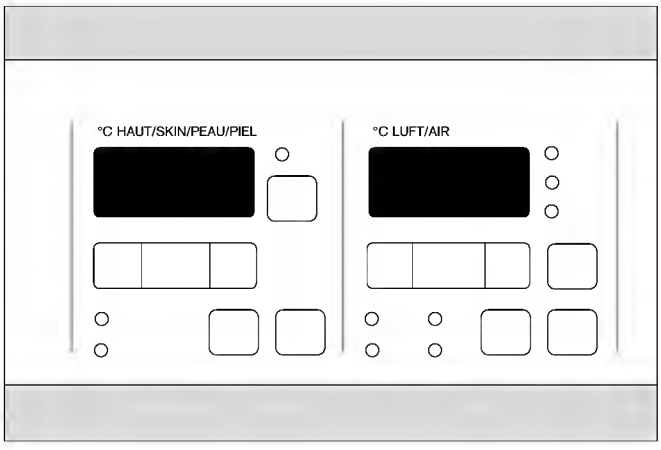
- Attach the sensor to the back in the region of the kidneys.

The sensor must never be attached under the baby since it would then be measuring and controlling core temperature and not skin temperature.

- **Check regularly that the skin temperature sensor is properly fixed to the baby's skin.**
  A skin temperature sensor which has fallen off would be measuring air temperature so that the baby could become overheated (though the temperature of the air in the incubator would not exceed 39 °C).
- **Do not use skin temperature sensors to measure rectal temperature.**

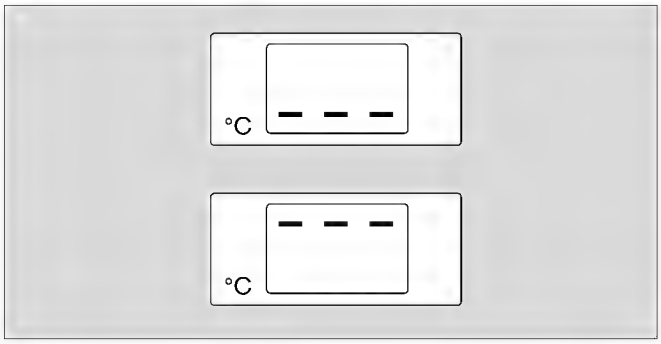
When a skin temperature sensor is attached but the "air temperature control" mode is in operation, the measured skin temperature is displayed.

Skin temperature is not then being controlled.



When the temperature falls outside the 30 °C to 42 °C measuring range:

- 3 dashes in the bottom of the display = temperature below 30 °C
- 3 dashes in the top of the display = temperature above 42 °C



- see "Fault, Cause, Remedy" section, p. 43.

Activating skin temperature control

Allow at least 5 minutes for the skin temperature sensor to reach the baby's temperature.

When value displayed remains constant,

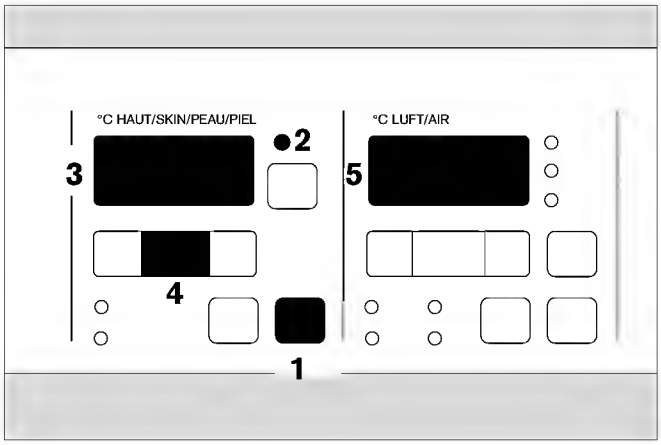
1 Press [Control] key,

2 green **Control** LED is lit,
skin temperature control is in operation.

3 The display alternates between measured value of skin temperature and the word **SEt**.

4 Flashing display of set value for skin temperature.

5 The measured value for air temperature continues to be displayed.

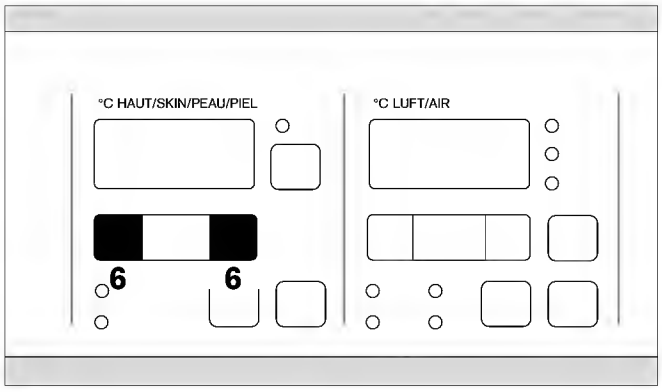


The incubator offers an appropriate value, depending on the situation.

Situation	Set value
Set value for air temperature not confirmed; Faulty or disconnected sensor	36.3 °C
Actual skin temperature below 35 °C when switching over	35 °C
Actual skin temperature between 35 °C and 37 °C when switching over	actual skin temperature selected
Actual skin temperature above 37 °C when switching over	37 °C

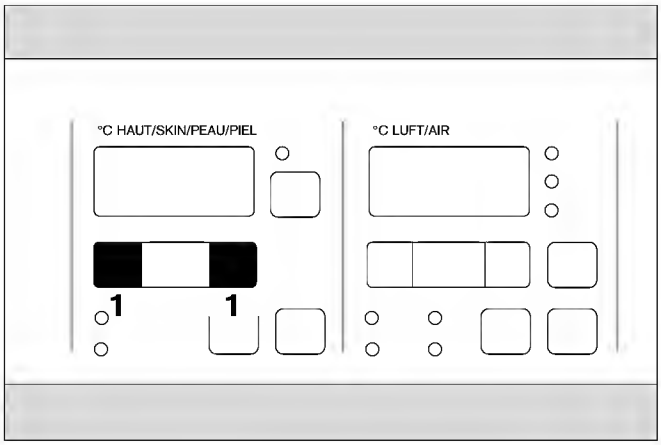
Confirming set value:

6 Press [↑] or [↓] key briefly, the display remains continuously lit.



Setting values in 35 °C to 37 °C range

1 Press [↑] or [↓] key until the set value required is displayed.



Time needed for control to be effective

Differences between the set value and the actual value for skin temperature are corrected by the temperature of the air in the incubator which is between a minimum of 28 °C and a maximum of 39 °C.

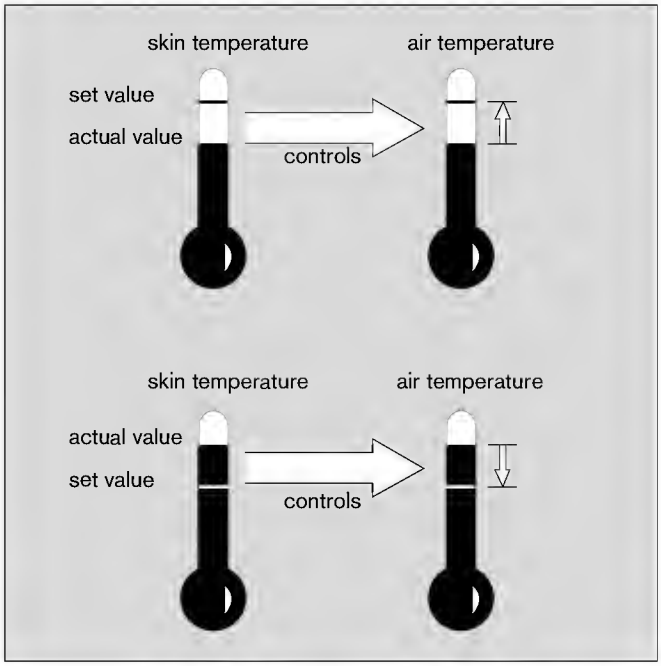
When the skin temperature required is higher than the actual temperature (skin too cold), air temperature in the incubator is increased.

When the skin temperature required is lower than the actual temperature (skin too warm), the air temperature in the incubator is decreased.

The length of time during which there is a difference between the set value and actual value of skin temperature also has an influence on the control of air temperature inside the incubator.

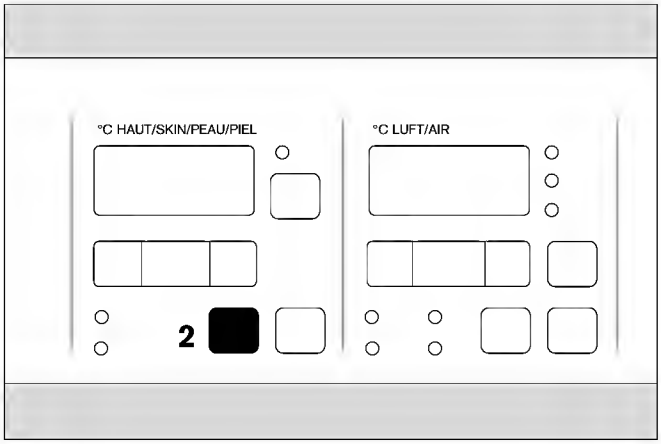
The patient's skin temperature can change suddenly, as a result of feeding or being handled, for instance, so that deviations of a few tenths of a degree are quite normal.

Therefore:
The value set for skin temperature should not be changed unless the core temperature needs to be corrected.

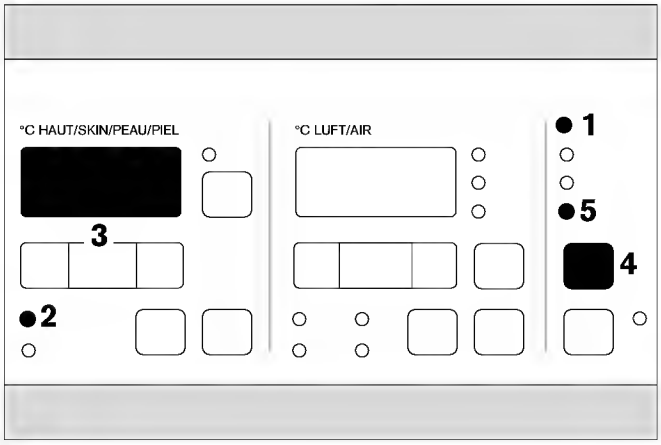


Check functioning during operation:

2 Press [Check 36 °C ± 0.1] key – the simulated temperature value should be 36 ± 0.1 °C.
Check daily.



Alarms



For **deviations greater than ± 0.5 °C** between set value and actual value of skin temperature:

1 Red **Alarm** LED and

2 Red **±0.5 °C** LED flash,

3 display flashes and intermittent tone commences.

The intermittent tone can be suppressed for 10 minutes:

4 Press [🔕] key.

5 Yellow 🔕 LED and

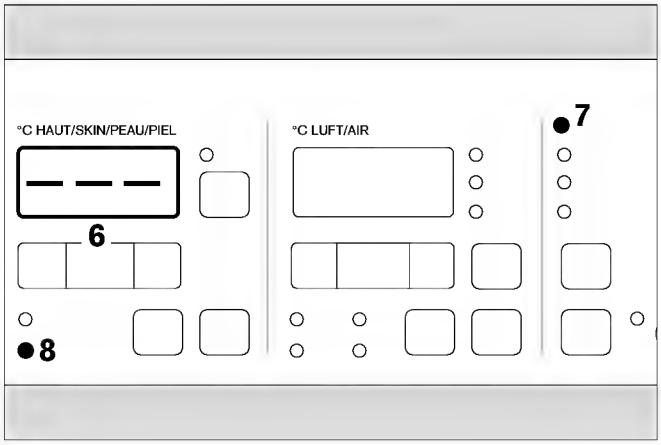
1 red **Alarm** LED are lit.

When measured value is within ±0.5 °C of the set value again,

2 **±0.5 °C** LED and

1 red **Alarm** LED go out.
intermittent tone ceases.

5 Yellow 🔕 LED goes out.



If **the sensor plug is disconnected** or **sensor is faulty:**

6 Display of 3 dashes in centre of display.

After 15 seconds:

- Intermittent tone commences.

6 Display of 3 flashing dashes in centre of display.

7 Red **Alarm** LED and

8 red **Sensor** alarm LED are lit.

Then:

- Connect sensor without delay or replace skin temperature sensor.

The intermittent tone can be suppressed for 10 minutes:

- Press [🔕] key, yellow 🔕 LED and red **Alarm** LED are lit.

ThermoMonitoring, optional

For a better diagnosis of the child's thermal condition, it is recommended that the temperature is measured both centrally and peripherally. Both temperature measurements may be displayed graphically via a Windows-PC or a Dräger BabyScreen to document both the progress of therapy for the child and the therapy itself.

Incubator must have:

- Second socket for peripheral skin temperature sensor,
- Operator panel with key,
- BabyLink interface and MediCable connecting cable (optional).

ThermoMonitoring data may be displayed on:

- Babyguard 8000 patient monitor
- BabyScreen (optional)
- Windows-PC with ThermoView programme (optional).

Follow relevant Assembly and Operating Instructions.

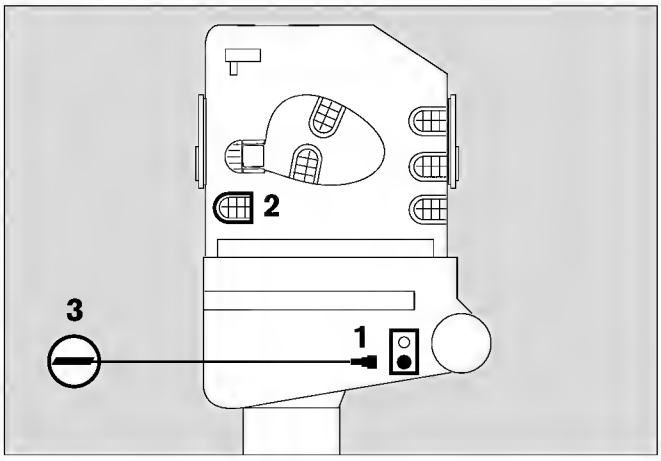
Connecting peripheral skin temperature sensor

1 Connect white peripheral skin temperature sensor to white socket on left of housing.

2 Route sensor cable through one of the hose seals.

3 Remove protective foil from adhesive pad and place skin temperature sensor on pad.

- Attach sensor to the patient's extremeties, preferably on the foot, using adhesive pad.
- Fix sensor cable in place with adhesive plaster.
- Connect Windows-PC or BabyScreen to serial Baby-Link interface using MediCable.
  Follow relevant Instructions for Use.



Displaying measured values from peripheral skin temperature sensor

4 Press key and keep pressed. Yellow LED in key is lit.

5 Peripheral skin temperature is displayed.

4 Release key,

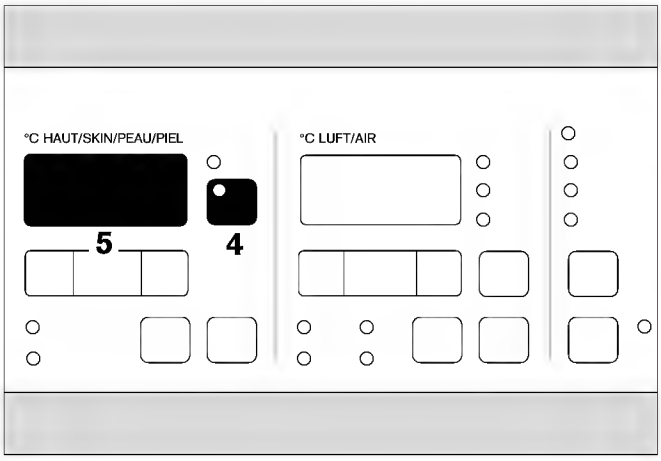
5 skin temperature recorded centrally by first skin temperature sensor is displayed again.

If 3 dashes appear in the display, see p. 25 and p. 27.

The measured value of the peripheral temperature does not affect the control of the temperature in the incubator.

Both in air temperature and skin temperature mode the peripheral skin temperature sensor can be disconnected. No alarm will be given.

Both skin temperatures can be displayed when the incubator is operating in the air temperature mode.

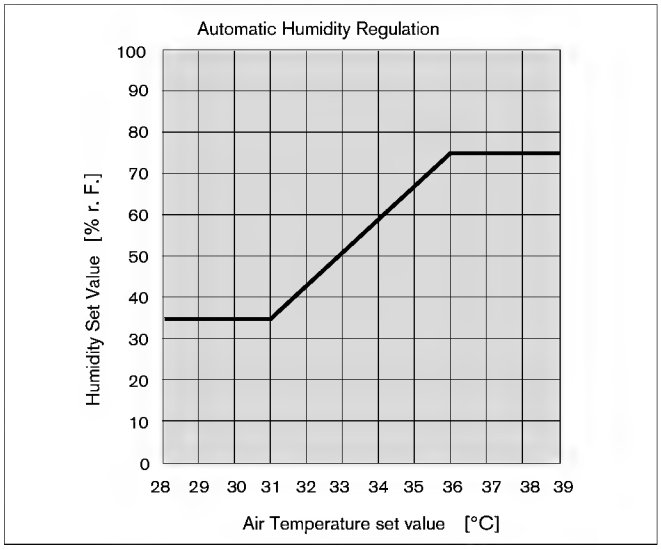


Using humidity control

It is possible to control air temperature and relative humidity in both automatic and manual modes.

In the **automatic** mode the set value for humidity is calculated and adjusted automatically by the system, depending on the air temperature set value, see diagram. Maximum relative humidity is 75 %.

In the **manual** mode the set value for humidity can be adjusted between 35 % and 85 %, using ↑ or ↓ keys.



Activating humidity control in automatic mode

1 Press Control key,

2 green **Control** LED is lit.

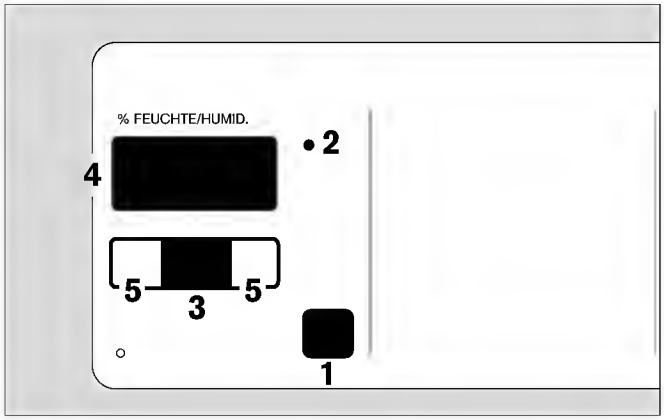
3 The word **Aut** (automatic) is displayed.

4 The word **SEt** and the measured relative humidity in the incubator alternate in display.

5 Press ↑ or ↓ key briefly,

3 the word **Aut** remains continuously lit.

4 Measured relative humidity is displayed.



Activating humidity control in manual mode

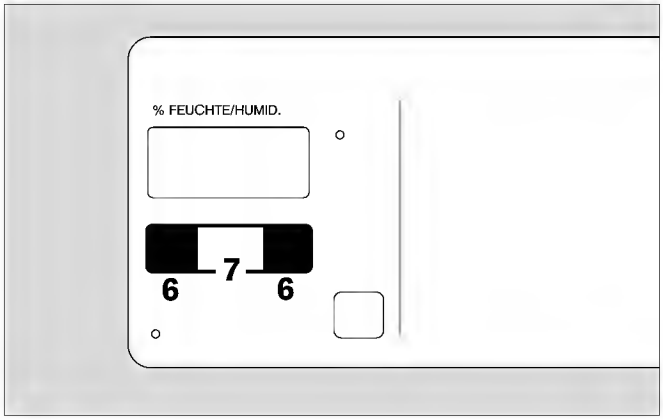
6 Press ↑ or ↓ key again briefly to activate **manual mode**.

7 Previous set value for humidity calculated by system is displayed.

6 Enter set value required using ↑ or ↓ key.

At humidity values >60 % condensation may appear on the incubator walls.
Then:

- Decrease set value for humidity (if therapy allows).



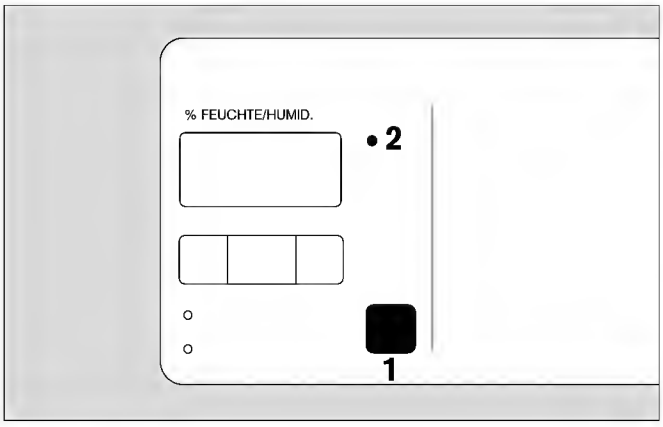
Switching from manual mode to automatic mode:

1 Press Control key to switch humidity module off.

2 Green **Control** LED goes out.

1 Press Control key again to activate humidity module in automatic mode.

2 Green **Control** LED is lit.



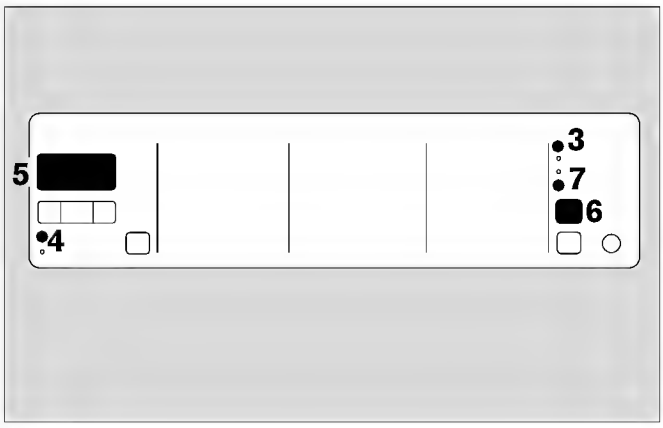
Alarm for water shortage:

3 Red **Alarm** LED flashes,

4 red **H2O** LED and

5 display flash.
Intermittent tone commences.

- Replenish water supply, see p. 19.



The intermittent tone can be suppressed for 10 minutes:

6 Press key,

7 yellow LED and

3 red **Alarm** LED are lit.

When cause of alarm has been rectified:

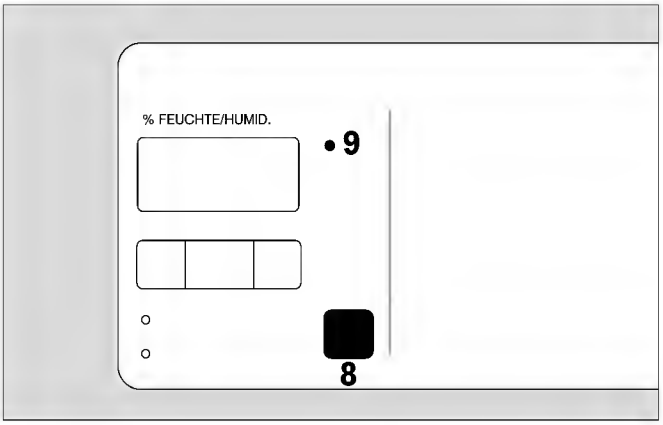
- LEDs go out, intermittent tone ceases.

Other alarms, see "Fault, Cause, Remedy", p. 41 and 45.

Switching off humidity control:

8 Press Control key = humidity module switched off.

9 Green **Control** LED goes out.



Using oxygen control

Caution: physiological risks from oxygen

The air in the incubator should only be enriched with oxygen if prescribed by a doctor. Oxygen enrichment should be controlled on the basis of the arterially measured oxygen partial pressure in the blood of the patient. This is the only way in which both hyperoxaemia (damage to the eyes) and hypoxaemia (damage to the brain) can be prevented.

- Connect probe on O_2 connecting hose to terminal unit of medical gas pipeline system.

1 Press [Control] key.

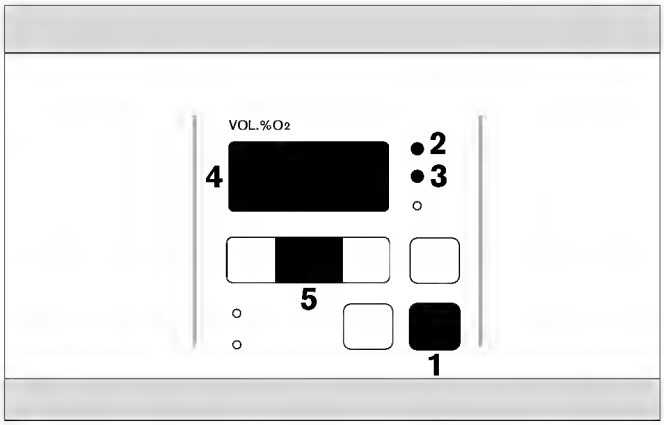
2 Green **Control** LED is lit.

3 Yellow **Cal.** LED and

4 word **CAL** flash.

5 Set value **21** flashes in display.

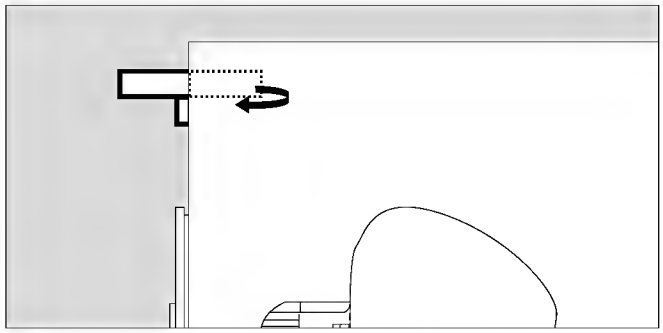
- Calibrate O_2 sensor within one minute, or sensor alarm will occur.



Calibrating sensor

Calibrate sensor at outset of O_2 control and every 24 hours of continuous operation.

- Pull climate sensor out of incubator at 90° angle.

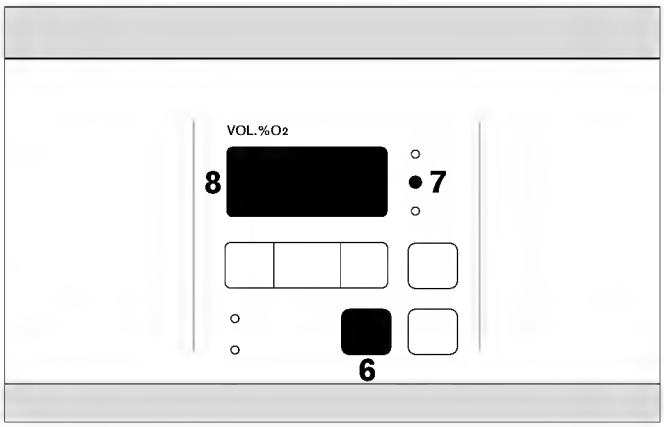


Within one minute, or sensor alarm will occur:

6 Press [Cal. 21%] key.

7 Yellow **Cal.** LED is lit.

8 Display alternates between word **CAL** and "– –".



It will take between 45 and 135 seconds to complete calibration.

1 Display alternates between word **SEt** and measured value **21**.

- Push climate sensor back into position within one minute, or sensor alarm will occur.

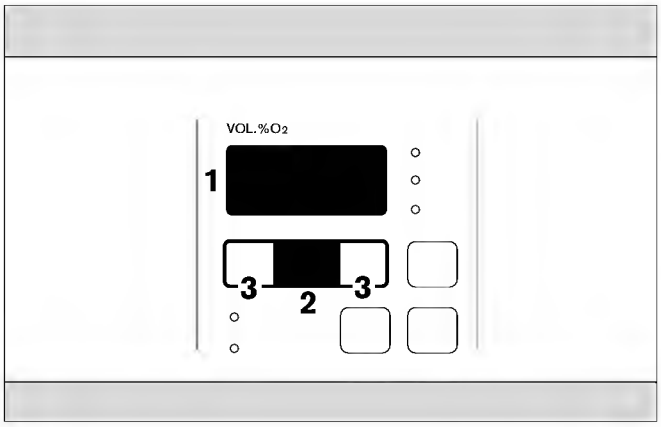
2 Set value **21** flashes in display.

3 Press [↑] or [↓] key briefly, to confirm set value.

Or

3 press [↑] or [↓] key until set value required (21 to 40 vol.% O_2) has been set.

1 Display of measured O_2 concentration.



Controlling oxygen at over 40 vol.% O_2

4 Press [>40%] key.

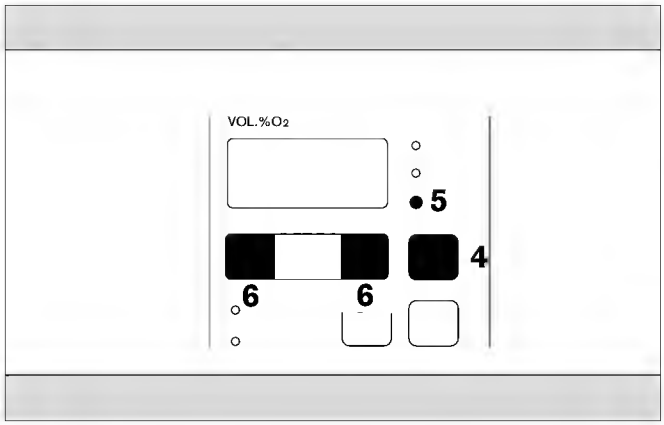
5 Yellow control LED **>40 %** is lit.

Range of set values has been extended to 75 vol.% O_2.

6 Press [↑] or [↓] key until set value required is displayed.

Value must be set within one minute or the extended set value range will be cancelled.

If value is re-set below 40 vol.% O_2, the extended range of set values is automatically cancelled.



Alarms

When **deviations are greater than ±5 %** between set value and measured value for O_2 concentration:

7 Red **Alarm** LED and

8 red **±5 vol.%** LED flash,

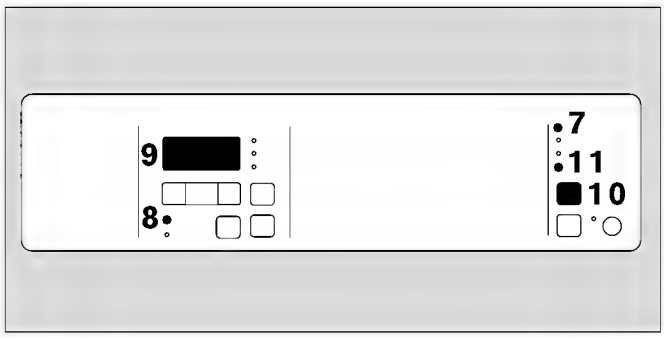
9 display flashes and intermittent tone commences.

The intermittent tone can be suppressed for 10 minutes:

10 Press [🔕] key.

11 Yellow 🔕 LED and

7 red **Alarm** are lit.



When measured value is within ±5 vol.% again:

- **±5 vol.%** and **Alarm** LED go out.
- Yellow 🔕 LED goes out.
  The intermittent tone ceases.

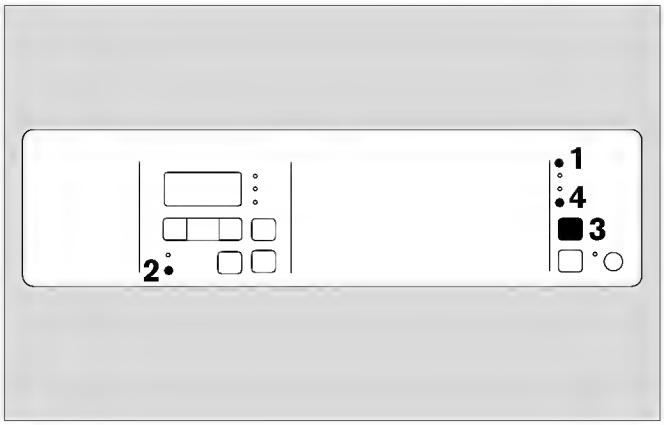
If **sensor plug is disconnected, climate sensor is pulled out** or **sensor is faulty:**

1 Red **Alarm** LED and

2 red **sensor** alarm LED are lit. Continuous tone commences.

Then:

- Connect climate sensor plug, push back climate sensor or change O2 sensor capsules without delay.



The intermittent tone can be suppressed for 10 minutes:

3 Press [🔔] key.

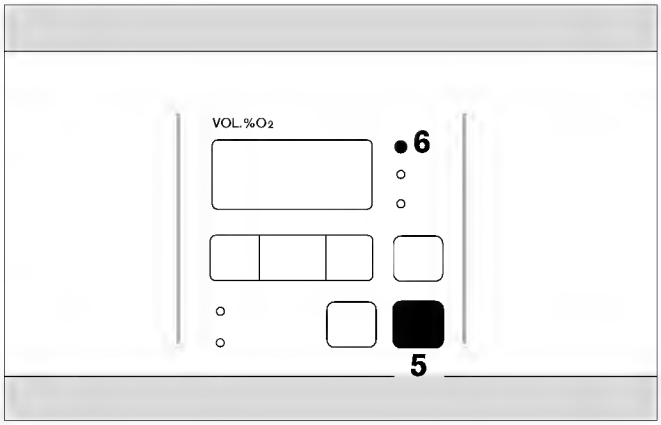
4 Yellow 🔔 LED and

1 red **Alarm** LED are lit.

For description of other alarms, see "Fault, Cause, Remedy", p. 41 and 44.

Switching off O2 control module

- when there is a fault in O2 control module (**Err** display),
- when there is a sensor alarm which cannot be rectified,
- when the deviation from set value remains above 5 % even though O2 sources have been switched off,
- when oxygen therapy is finished.



5 Press [Control] key.

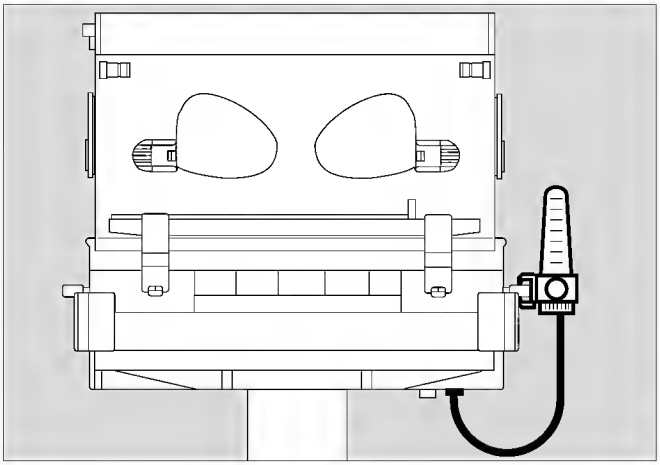
6 Green **Control** LED is no longer lit.

- Disconnect O2 probe from terminal unit of medical gas pipeline system or place in parking position.

If oxygen therapy is still required urgently:

- Supply oxygen manually, see p. 34.

Supplying oxygen manually

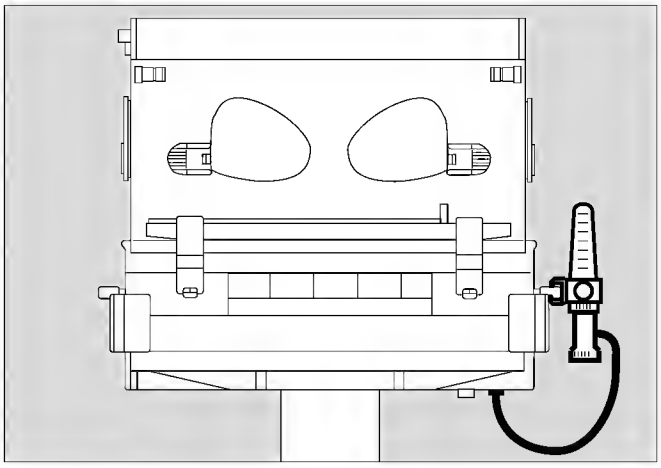


- Switch off O_2 control module and wait for 3 minutes, or Inop. alarm will occur.
- **Monitor O_2 concentration in incubator.**
  Use O_2 monitor, such as Dräger-Oxydig.
  Preparation, p. 12.
- To prepare flowmeter, see p. 12.
- Supply oxygen from a medical gas pipeline system via an O_2 flowmeter – push probe in fully.
- When concentration required is reached, switch off O_2 supply at flowmeter.

Recommended set values:

O_2 concentration Vol.% (approx.)	25	30	35	40	45	50	55	60
O_2 flow L/min	1.5	3.5	5.5	7.5	9	11	13	15

Using oxygen limiter



- Preparation, p. 12.

The handwheel of the O_2 limiter has 2 settings.

Red setting: no limitation of O_2 supply.

White setting: O_2 supply limited to 6 L/min = O_2 concentration about 40 vol.%, with O_2 flow valve fully open.

If a lower O_2 concentration is required, set O_2 supply to less than 6 L/min.

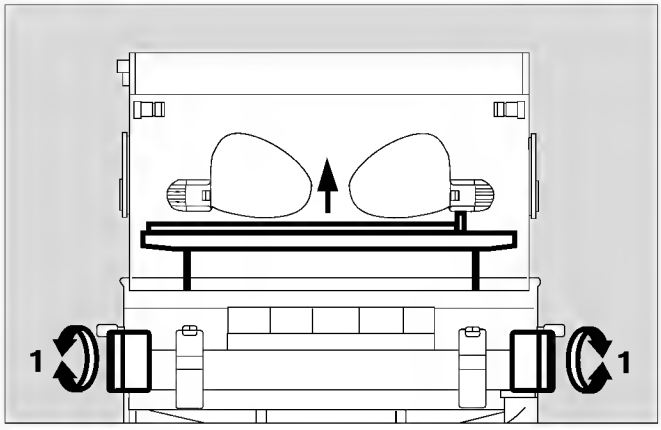
- Set handwheel as required.

Using electronic baby scales

Accessory

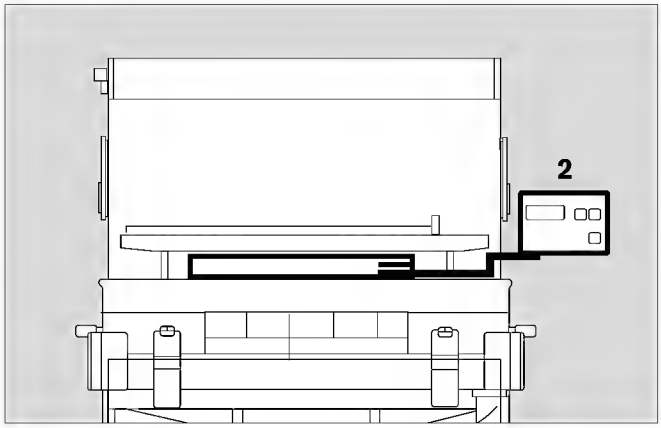
1 Set bed at maximum height with handwheels.

- Open front door.



2 Slide the electronic scales under bed as far as possible. Guide scales along ridges on base plate.

Rail carrying display unit passes through the lower hose seal.



- Close front door again and lower bed to its lowest setting.
- Weigh baby, following Instructions for Use for Seca Inscale Baby Scales.

After weighing:

- Take scales out in reverse order

or

- Scales may remain in incubator.
  Bed can be tilted, as before.

Using vacuum mattress

Accessory

The mattress can be formed into any shape, and will keep this shape after the mattress has been evacuated. In this way babies can be supported in extreme positions for special treatment. The standard mattress may also remain inside the incubator.

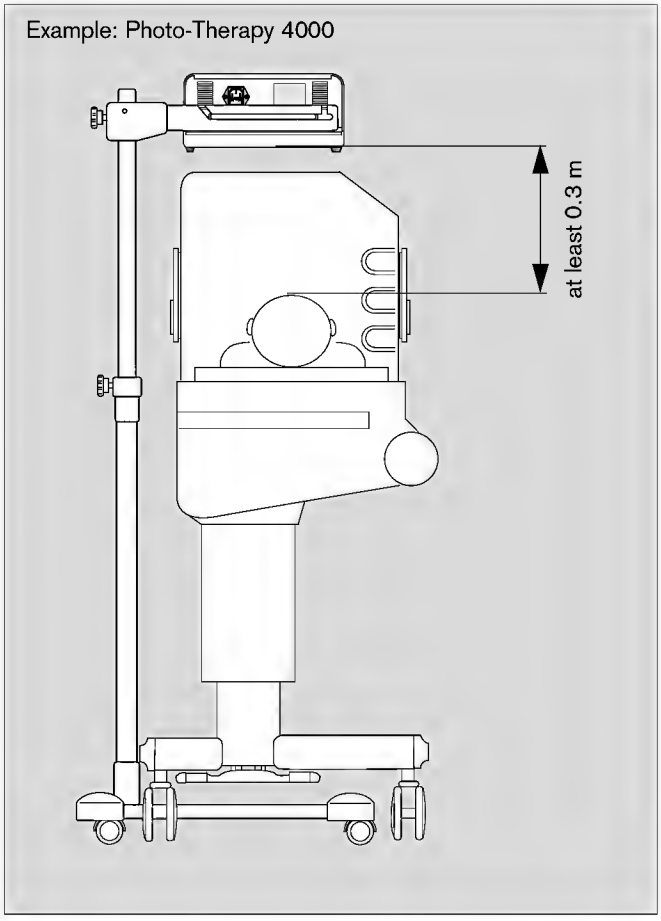
- Open front door.
- Place mattress inside and form it into approximately the shape required.
- Place baby on mattress and "mould" mattress around baby.
- Connect hose of suction unit to vacuum mattress. Open valve and evacuate vacuum mattress.
- Close valve and remove hose.
- Close front door.

Using phototherapy unit 800/8000/4000

Accessory
Follow relevant Instructions for Use.

- Push trolley carrying phototherapy unit under incubator.
- Adjust height:
  Minimum distance between bottom of phototherapy unit and patient is:
  0.4 m for Photo-Therapy 800/8000
  0.3 m for Photo-Therapy 4000

  If the working height or the height of the bed is changed later, make sure that this minimum clearance is still maintained.
- Follow safety advice, see p.18.



Using "BabyLink Incubator" interface

(optional)

The "Babylink Incubator" interface provides incubator data (actual values, set values, alarms) via a serial interface.
At present, measured values can be displayed as trends on the Babyguard 8000 Dräger Paediatric Monitor.
Other possible connections are the Dräger BabyScreen or any Windows-PC which can run the ThermoView program.

The interface protocol is included in the BabyLink modification set (82 90 607).

Follow Instructions for Use for interface.

Care

Clean and disinfect incubator thoroughly:
- after each change of patient
- at least once a week.

With septic patients:
- disinfect seals on hand ports daily.

Clean and disinfect the accessories, such as the suction equipment, the flowmeter and the skin temperature sensor in accordance with the relevant Instructions for Use.

Stripping down

- Switch off incubator. Disconnect from mains and disconnect the medical gas supply.
- Remove all accessories.

Empty water bottles/water container, otherwise risk of microbial contamination. Observing hospital hygiene regulations.

Water bottles:

- Fold down back panel.
- Allow water to flow back into bottles.

1 Remove bottles from holder and drain,

- Hold connecting hose by cuff and detach from connector on heater.
- Unscrew bottle holder.

Water container:

- Remove cover from water container.

1 Remove container from holder by lifting it up. Drain water, observing hospital hygiene regulations.

- Hold connecting hose by cuff and detach from connector on heater.

2 Open hand port, remove seals from hand port openings and close hand port again.

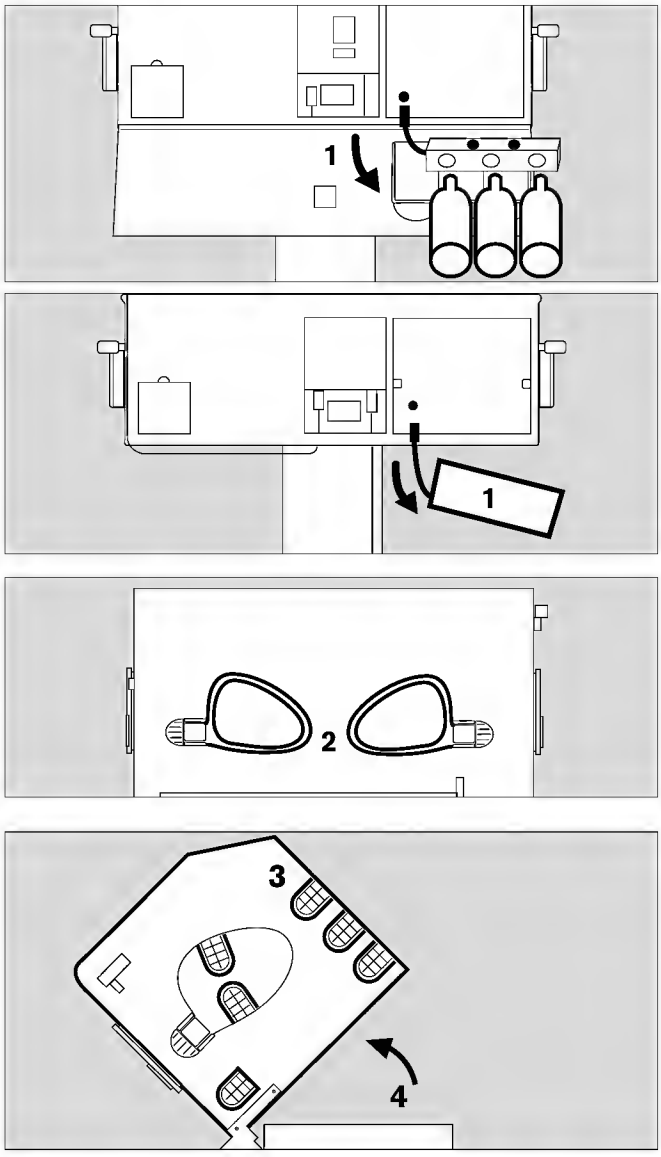
- Pull climate sensor out of canopy.

When skin temperature control option has been used:

- Disconnect skin temperature sensor.
- Remove skin temperature sensor from inside incubator.

3 Remove all hose seals.

4 Tilt canopy back as far as it goes.



1 Remove mattress from bed.

2 Lift off bed. Undo screw on ventilator hose support and remove hose support. Remove bed extension.

3 Pull both support brackets up and out.

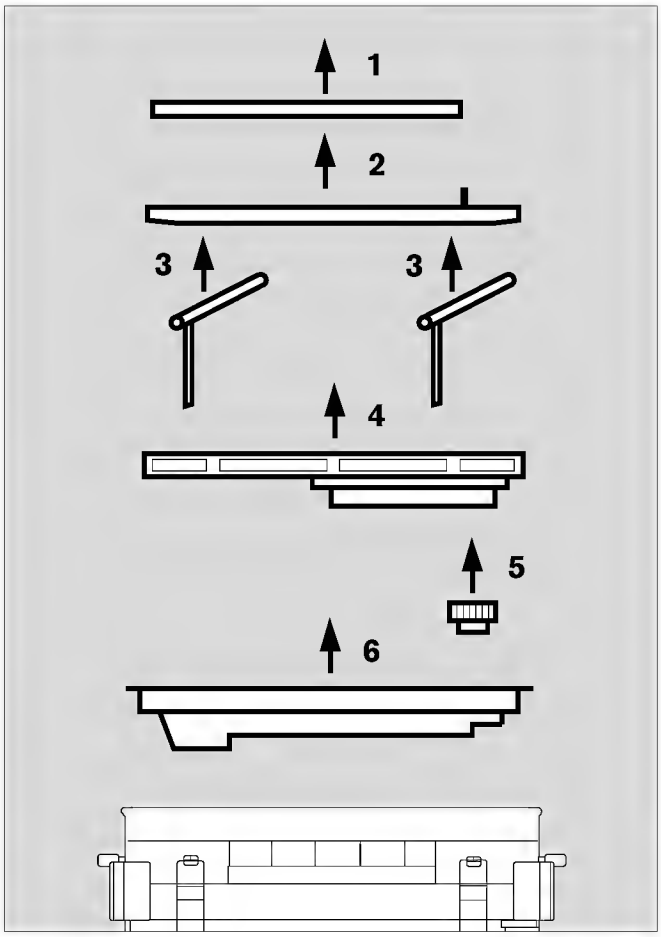
4 Remove base plate.

Caution. Be careful not to burn yourself.

The risk from the heater is particularly great when the incubator has been closed and this risk remains for a long time after the unit has been switched off. (After one hour heater temperature can still be 70 °C).

5 Remove fan.

6 Remove trough.



Cleaning/disinfecting/sterilizing

For users in the Federal Republic of Germany we recommend that only disinfectants on the current DGHM (DGHM: German Society for Hygiene and Microbiology) list of surface disinfectants are used.

For medical and hygienic reasons, disinfectants based on quaternary compounds should be used.

Damage may occur to the material of the incubator, particularly to the sensetive covering parts (PMMA/plexiglass and PC/polycarbonate), if preparations are used which are based on
- chlorine-releasing compounds
- organic and inorganic acids
- alcohols.

With regard to material compatibility we recommend the following surface disinfectants:

Demykosan AF	Messrs. Bayrol, Munich
Incidur	Messrs. Henkel, Düsseldorf
Sekusept Powder	Messrs. Henkel, Düsseldorf

Follow manufacturer's instructions.

A precondition for using non-recommended disinfectants is that the manufacturer can prove material compatibility with PMMA and PC.

Canopy, inside and outside
Inner wall (folded down or removed)
Mattress
Bed and bed extension
Support brackets
Base plate
Trough
Incubator housing, inside and outside
Climate sensor:

- Remove obvious soiling with disposable cloth and detergent.
- Wipe-disinfect surfaces.
- Allow time for the disinfection process, then wipe the surfaces again with a clean, damp cloth and dry.
- Do not allow any liquid to get into climate sensor.

Fan
Seals
Hose seals
Connecting hose
Bottle holder or water container

- Wash with detergent and rinse with clean water.
- Disinfect in bath. Allow time for the disinfection process, then rinse with clear water and dry;

or

- sterilize at 120 °C (glove programme).

Use recommended cleaning and disinfecting agents only. If other agents, such as alcohol for instance, are used there is a risk of tension cracks in acrylic sheet and Makrolon.

Do not spray or bath disinfect climate sensor.

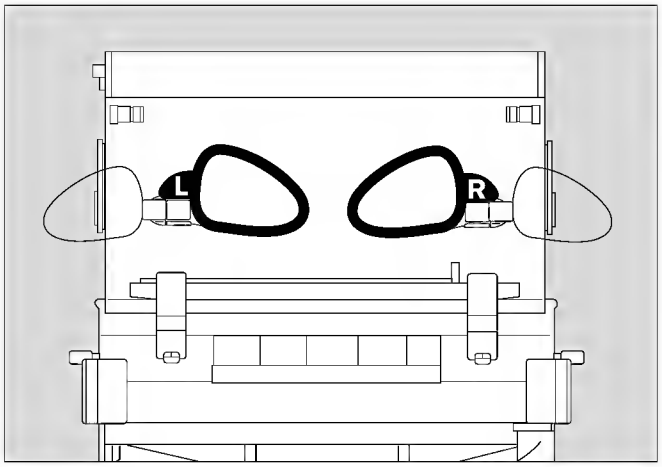
Do not use UV-radiation on the incubator. This may cause cracks in the acrylic sheet.

Before re-using for a patient

- Re-assemble equipment, see "Stripping down", p. 37-38.
- Check that the seals for support bracket in the trough are movable.

Fitting seals in the hand port openings:

- Open hand port.
- Insert seal marked with an "**L**" on nose, into left opening.
- Insert seal marked with an "**R**" on nose, into right opening.
- Position nose of seal on hinge.
  Put sealing lip (thin edge of profile) to the outside.
- Close hand port.



- Testing Readiness for Operation, see p. 14.

Allow water heater to run dry:

- to disinfect heater
- to test that "water shortage" display is working properly.

- Switch on humidity control.
- Allow heater to run until "water shortage" alarm is triggered, see p. 30.
- Switch off humidity control.

Do not put full bottles into bottle holder until just before placing baby in incubator.

If using water container:
Do not refill water container until just before placing baby in incubator.

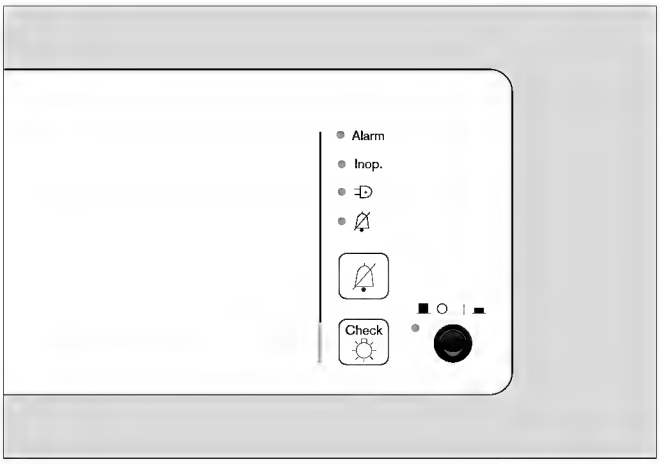
- Operate incubator in standby, p. 19

or

- switch off incubator, cover with dust cover and store ready for use.

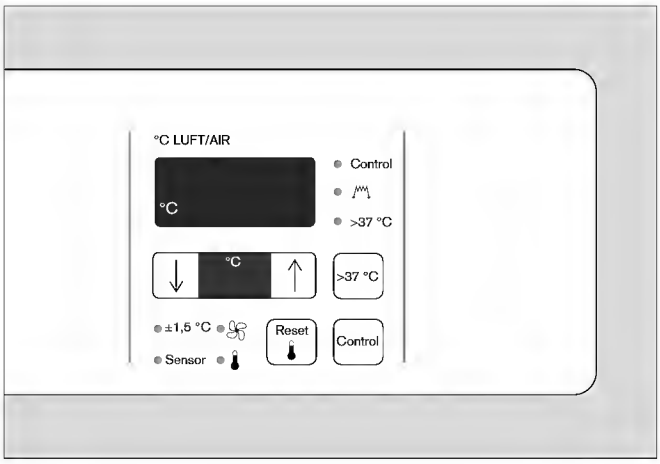
Fault, Cause, Remedy

Main module



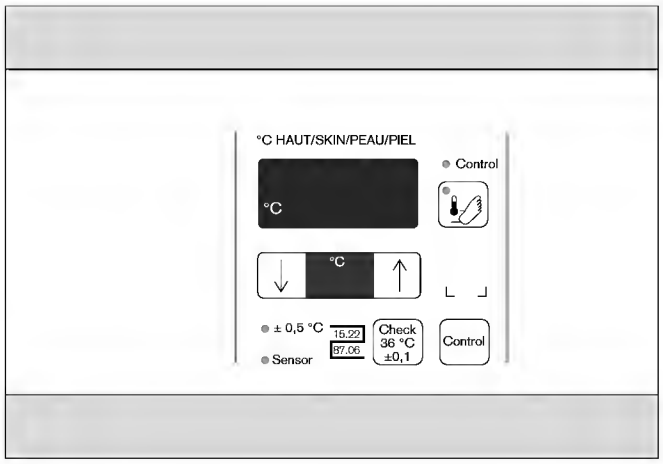
Fault	Cause	Remedy
Red **Alarm** LED is lit. Alarm sound commences.	Fault in module.	Fold down flap with Brief Instructions for Use and identify faulty module. See "Fault, Cause, Remedy" of module.
Red **Inop.** LED is lit. Continuous tone commences.	Basic fault in electronics.	Switch incubator off and on again. If **Inop.** message not repeated: press Reset key and reset values. If **Inop.** message repeated, incubator not working. Call DrägerService.
Red **Inop.** LED is lit. Continous tone commences, also **Err** display in a module (except air temperature control module).	Fault in specific module: Skin temperature control module/ humidity control module/O_2 control module	 Switch off specific module. All other functions will remain operational. Call DrägerService.
Red ⇉ LED is lit. Continuous tone commences.	No mains supply. Fault in incubator.	Check that mains plug is connected to power supply. Check that power is being supplied. Inform in-house technical staff. Call DrägerService.

Air temperature control module



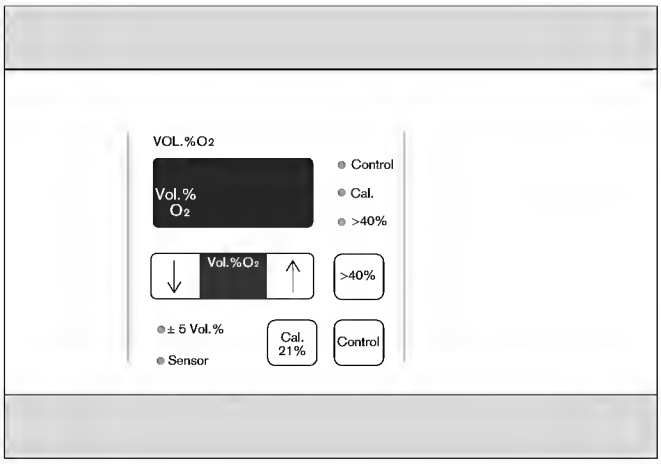
Fault	Cause	Remedy
Red **±1.5 °C** LED flashes. Actual value display flashes. intermittent tone commences.	Air temperature in incubator is deviating from set value by more than ±1.5 °C	Below set value: close openings in canopy and wait for incubator to warm up. Above set value: remove additional heat sources (lamps, radiators, sunlight). Wait until incubator has cooled down.
Red 🌡 LED flashes. Actual value display flashes. intermittent tone commences.	Air temperature above 38 °C (Range of values set up to 37 °C) Air temperature above 40 °C (Range of values set up to 39 °C)	Remove additional heat sources (lamps, radiators, sunlight). Wait for incubator to cool down. Press [Reset] key when temperature has dropped below the alarm limit for temperature.
Red LED flashes. Actual value display flashes. Continuous sound commences.	Fan not fitted. Fan not rotating or rotating too slowly.	Fit fan. Check that fan is connected to drive shaft properly. Call DrägerService.
Red **Sensor** LED flashes. Three dashes flash in centre of value display. Continuous tone commences.	Incubator temperature below 5 °C. Climate sensor disconnected. Faulty air temperature sensor.	Wait for incubator to warm up fully. Connect climate sensor. Call DrägerService.

Skin temperature control module (optional)



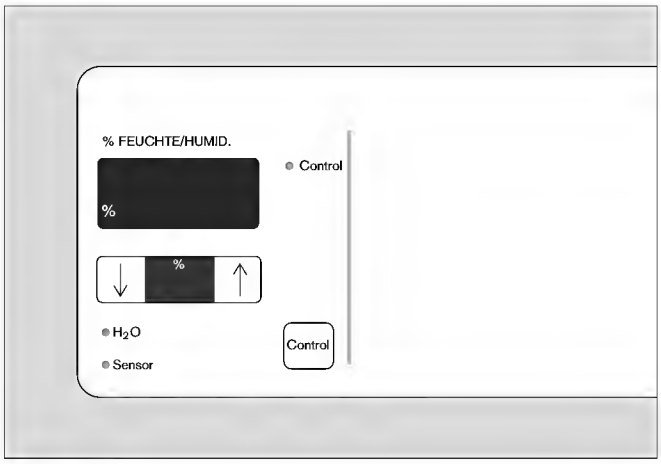
Fault	Cause	Remedy
Red **±0.5 °C** LED flashes. Actual value display flashes. Intermittent tone commences.	Skin temperature deviating from set value by more than ±0.5 °C.	Below set value: check that sensor is properly fitted to patient. Above set value: measure core temperature of patient and inform doctor responsible for patient immediately.
Red **Sensor** LED flashes. Three dashes flash in centre of actual value display. Continuous tone commences.	Skin temperature sensor not properly connected. Faulty skin temperature sensor.	Check connection and put right, if necessary. Replace sensor.
Err flashes in actual value display. Red **Inop.** LED is lit in main module. Continuous tone commences.	Fault in skin temperature control module while in operation.	Switch to air temperature control. Call DrägerService.
Err is lit in actual value display.	Fault in the skin temperature control module; skin temperature control switched off.	Other modules continue to operate properly. Call DrägerService.
Reference temperature of 36 °C is outside tolerance of ±0.1 °C when Check 36 °C ± 0.1 key is pressed.	Temperature measuring unit not operating correctly.	Call DrägerService.
Three dashes are lit at the top in actual value display.	Temperature measured above 42 °C.	Cooling required. Inform doctor responsible for patient immediately.
Three dashes are lit at bottom of actual value display.	Temperature measured below 30 °C.	Check that sensor is properly fitted to patient.

Oxygen control module



Fault	Cause	Remedy
Red **±5 vol.%** LED flashes. Actual value display flashes. Intermittent tone commences.	Oxygen concentration is deviating from set value by more than ±5 vol.%	Below set value: Close opening of canopy. Check O2 connection. Above set value: Switch off any other O2 source. If O2 concentration does not drop, switch off O2 control module, disconnect from medical gas pipeline system, and supply oxygen manually. Call DrägerService.
Red **Sensor** LED flashes. Three dashes flash in centre of actual value display. Continuous tone commences.	Sensor not connected. Sensor pulled out. Climate sensor not properly connected.	Connect sensor. Push sensor back. Check connection.
Red **Sensor** LED flashes. **CAL** flashes in actual value display. Continuous tone commences.	Calibration not started.	Calibrate O2 sensors.
Yellow **Cal.** LED flashes. **CAL** flashes in actual value display. Continuous tone commences.	Request to calibrate O2 sensors at start and every 24 hours of continuous operation.	Calibrate O2 sensors.
Err flashes in actual value display. Red **Inop.** LED is lit in main module. Continuous tone commences.	Fault in oxygen control module while oxygen control is activated.	Switch off O2 control module and supply oxygen manually. Call DrägerService.
O2 measured value flashes in actual value display. Red **Inop.** LED is lit in main module. Continuous tone commences.	Oxygen control module switched off but O2 concentration continues to rise.	Disconnect from all O2 supplies. Switch incubator off and on again. If fault persists, call DrägerService.
Err is lit in actual value display.	Fault in oxygen control module, oxygen control switched off.	Other modules continue to operate properly. Call DrägerService.

Humidity control module



Fault	Cause	Remedy
Red **H2O** LED flashes. Actual value display flashes. Intermittent tone commences.	Not enough water. Fault in water heater.	Refill water bottles. Switch off humidity control module. Call DrägerService.
Red **Sensor** LED flashes. Actual value display flashes. Continuous tone commences.	Faulty sensor. Climate sensor not properly connected.	Switch off humidity control module. Call DrägerService. Check connection.
Err flashes in actual value display. Red **Inop.** LED is lit in main module. Continuous tone commences.	Fault in humidifier. Humidity control activated.	Switch off humidifier. All other functions remain operational. Call DrägerService.
Err is lit in actual value display.	Fault in humidifier. Humidity control switched off.	All other functions remain operational. Call DrägerService.

Height adjustment

Fault	Cause	Remedy
Height does not adjust when pedals operated.	Thermal fuse triggered. Incubator in end stop position. Faulty lifting mechanism.	Wait until motor has cooled. No further adjustment possible. Call DrägerService.

Maintenance Intervals

Clean and disinfect incubator and parts before carrying out any maintenance procedures, and before returning for repair.

O2 sensor capsules	replace when sensors can no longer be calibrated. Disposal, see below.
Air filter	replace after two months, p. 15. Dispose of as normal waste.
Seals of hand port openings	replace, when the material becomes brittle or tacky or when a proper seal can no longer be obtained.
Hose seals	replace, when the material becomes brittle or tacky and when the lamination is torn.
Ventilator motor	grease with 10 drops of 51524-HLP 32 oil every six months by trained service personnel.
NiCd battery for power failure	replace once a year by trained service personnel. Disposal, see below.
Inspection and service*	every six months by trained personnel.

Disposal of O2 sensor capsules and NiCd batteries

- do not throw into fire; they may explode.
- do not open by force; risk of corrosion.

O2 sensor capsules and batteries must be treated as special waste:

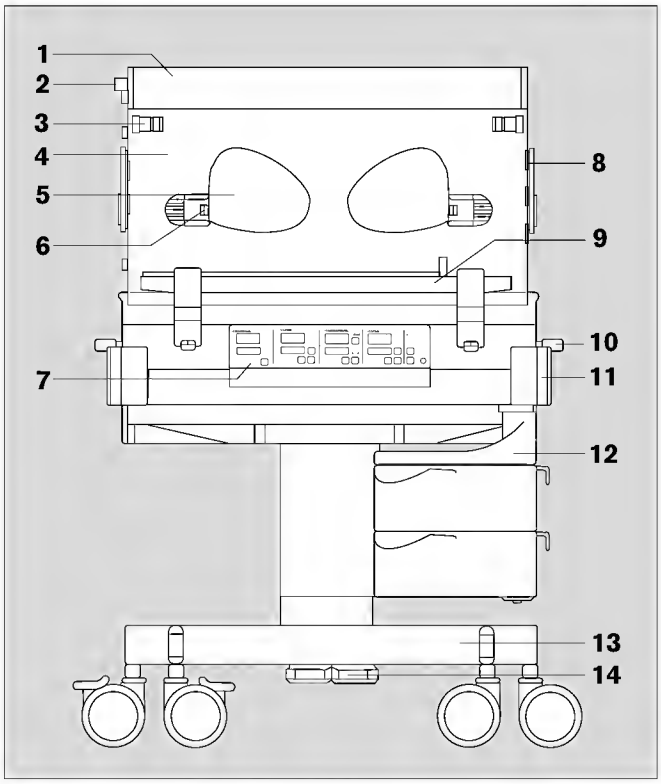
- in accordance with local waste disposal regulations.

Information can be obtained from local environmental and public health authorities or from approved waste disposal companies.

* According to DIN 31 051 the following definitions apply:
Inspection = determining actual condition
Service = measures to maintain required condition
Repair = measures to re-establish required condition
Maintenance = inspection, service and, when necessary, repair

What's What

Front view



1 Canopy

2 climate sensor

3 Front door catch

4 Front door

5 Hand port

6 Hand port catch

7 Control panel and flap with brief instructions

8 Hose seals, set of 8 (10)

9 Bed with mattress and bed end

10 Rail, left and right

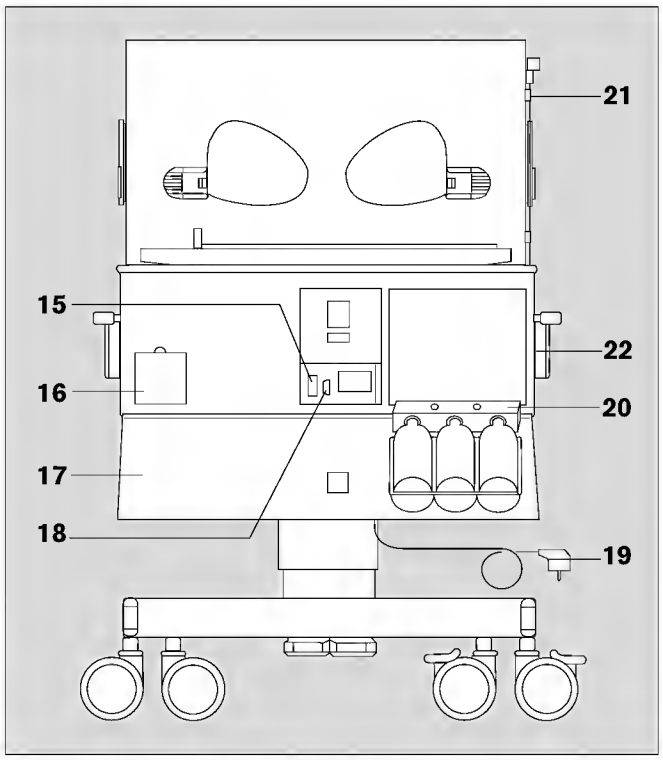
11 Handwheels, left and right, to tilt bed

12 Swivel cupboard, right

13 Trolley with fheight adjusted column and four castors (2 lockable)

14 Pedals to adjust height

Back view



15 Connector for climate sensor

16 Air filter

17 Back panel

18 Optional RS 232 connection

19 Mains cable

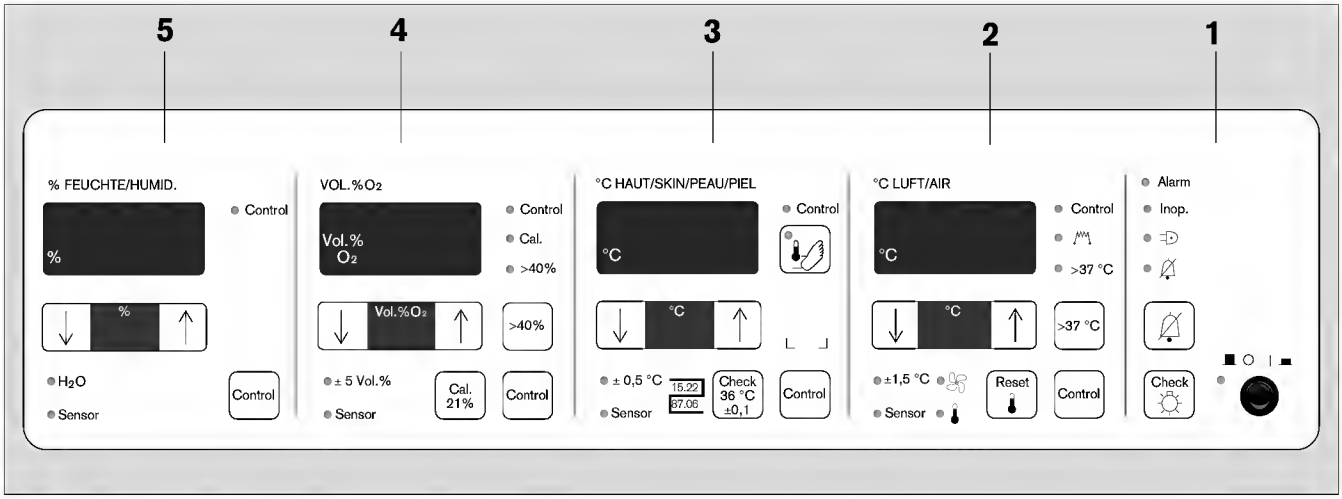
20 Bottle holder for 3 bottles

21 Holder for sensor cable

On side of incubator

22 Sockets for skin temperature sensor (optional)
Top socket (yellow): skin temperature control
Bottom socket (white): ThermoMonitoring only

Control panel



1 Main module with on / off switch and check key

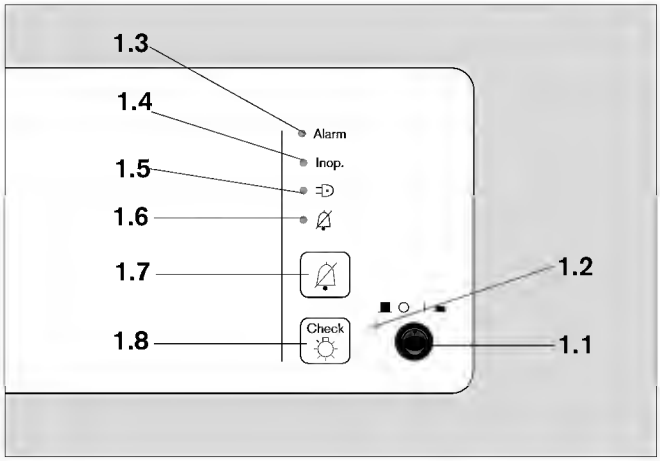
2 Air temperature control module

3 Skin temperature control module

4 Oxygen control module

5 Humidity control module

Main module



1.1 On / off switch for mains power

1.2 Green **Control** LED;
is lit when incubator is switched on.

1.3 Red **Alarm** LED;
is lit when there is a fault in a module.

1.4 Red **Inop.** LED;
is lit when there is a malfunction.

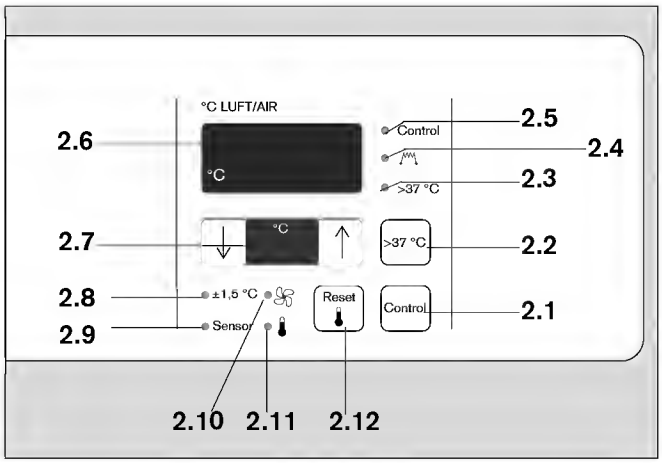
1.5 Red ⊐D LED;
is lit during mains power failure.

1.6 Yellow 🔔 LED;
is lit when intermittent tone has been suppressed.

1.7 Key to suppress intermittent tone for 10 minutes.

1.8 Key to test functioning of displays, LEDs and alarm sound.

Air temperature control module



2.1 Key to switch on air temperature control (only when skin temperature control module is fitted).

2.2 Unlocking key for setting a higher range of values up to 39 °C.

2.3 Yellow **>37 °C** LED; is lit when a higher range of values has been set.

2.4 Green LED; indicates heating-up phase.

2.5 Green **Control** LED; is lit when air temperature control is switched on (only when skin temperature control module is installed).

2.6 Display for actual value (measured value) of air temperature.

2.7 Display for set value of air temperature; left key: to decrease set value right key: to increase set value.

2.8 Red **±1.5 °C** LED; flashes/is lit when the actual value of the air temperature deviates from the set value by more than 1.5 °C.

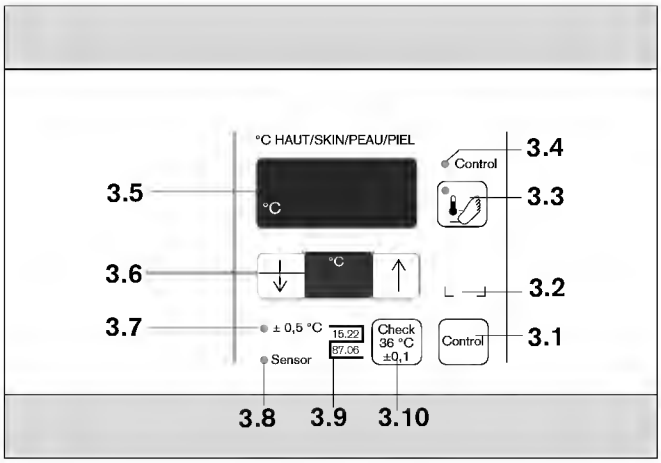
2.9 Red **Sensor** LED; flashes when air temperature sensor is faulty.

2.10 Red LED; flashes for fan failure.

2.11 Red LED for high temperature; flashes / is lit when air temperature is or was higher than 38 °C (40 °C for higher range of set values) and in advance of Inop-alarm.

2.12 Key to reset high temperature alarm.

Skin temperature control module



3.1 On / off button for skin temperature control.

3.2 Calibration stamp (only in Germany).

3.3 Key to display peripheral skin temperature (only when ThermoMonitoring option is installed).

3.4 Green **Control** LED; is lit when skin temperature control is switched on.

3.5 Display for actual value (measured value) of skin temperature.

3.6 Display for set value of skin temperature left key: to decrease set value right key: to increase set value.

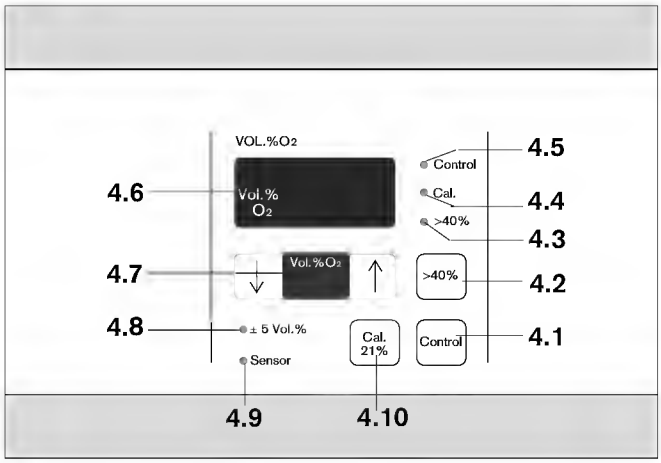
3.7 Red **±0.5 °C** LED; flashes/is lit when the actual value of skin temperature deviates from the set value by more than 0.5 °C.

3.8 Red **Sensor** LED; flashes/is lit when the skin temperature sensor is faulty or disconnected.

3.9 Certification mark.

3.10 Key for checking measurement electronics Display 36 ± 0.1 °C (reference).

Oxygen control module



4.1 Key to switch oxygen control on / off.

4.2 Unlocking key to extend set values to 40 to 75 vol.% O_2 range.

4.3 Yellow **>40 vol.%** LED;
is lit when set value range has been extended.

4.4 Yellow **Cal.** LED;
flashes to request calibration;
is lit during calibration.

4.5 Green **Control** LED;
is lit when oxygen control is switched on.

4.6 Display for actual value (measured value) of oxygen concentration.

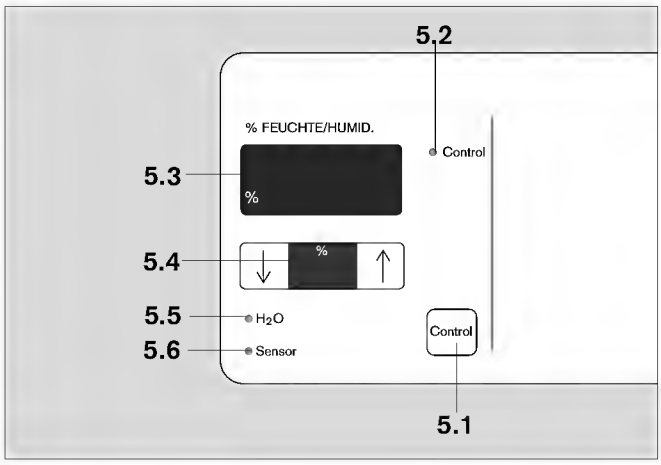
4.7 Display for set value of oxygen concentration;
left key: to decrease set value
right key: to increase set value.

4.8 Red **±5 vol.%** LED;
flashes / is lit when actual value of oxygen concentration deviates from the set value by more than 5 vol.%.

4.9 Red **Sensor** LED;
flashes when sensor is faulty, or pulled out.

4.10 Key to calibrate O_2 sensor.

Humidity control module



5.1 Key to switch humidity control on / off.

5.2 Green **Control** LED;
is lit when humidity control is switched on.

5.3 Display for actual value (measured value) of humidity control.

5.4 Display for set value of humidity;
left key: to decrease set value
right key: to increase set value

5.5 Red **H_2O** LED;
flashes/is lit for water shortage.

5.6 Red **Sensor** LED;
flashes if sensor is faulty.

Technical Data

Ambient conditions:

During operation	
Temperature	20 °C to 30 °C
Atmospheric pressure	900 to 1100 hPa
Rel. humidity	15 to 95 %
During storage	
Temperature	0 °C to 70 °C
Atmospheric pressure	900 to 1100 hPa
Rel. humidity	15 to 95 %

Operating data

Electrical power source	220 / 230 to 240 V AC (as per order) 50 / 60 Hz (as per order)
Heat output at 230 V	
Air	400 W
Water heater	100 W
Current consumption at 230 V	4.8 A
Fuse for height adjustment	3.15 A IEC 127-2/III, 2 ea.

Performance data

Warming-up time	35 minutes from 20 °C to 31 °C (with or without humidification)
Temperature drop (at room temperature of 25 °C and temperature inside incubator of 36 °C)	
Two hand ports opened	<1 °C
Front door opened	<5 °C
Increase of O_2 oxygen concentration from 21 to 60 vol.%	<7 min
Humidification	Evaporation of distilled or demineralised water
Air speed over the bed	<8 cm/second
Fresh air flow	30 L/min
CO_2 flushing, according to IEC 601-2-19/105.1 maximum CO_2 concentration inside incubator	0.2 %
Raising bed	right or left, 10° angle of continuous tilt at both ends
Range of measured values	
Air temperature	10 °C to 50 °C
Skin temperature	30 °C to 42 °C
O_2 concentration	0 to 99 vol.%
Air humidity	0 to 99 % r.H.
Range of set values	
Air temperature	28 °C to 39 °C
Skin temperature	35 °C to 37 °C
O_2 concentration	21 to 75 vol.%
Air humidity	35 to 85 % r.H.

Measuring principles of sensors	
Air temperature sensor	NTC x 2
Skin temperature sensor	NTC
O_2 concentration	galvanic cell
Air humidity	capacitive
Noise level inside the canopy	<49 dB (A) at 50 Hz; <56 dB (A) at 60 Hz
Air filter	Particle class P 2, in accordance with DIN 3181, factor 2 %
Skin temperature control	
Sensor	Use only authentic Dräger sensors (see Order List, p. 57)
Certification marks*	
Display component, subject to calibration	15.22 87.06
Sensor** subject to calibration (2M 20 737)	15.14 91.10
Certification document*	
Display component, subject to calibration	IB.13-78/87
Sensor** subject to calibration	IB.9.13-205/91
Calibration tolerances*	
Display component, subject to calibration	±0.2 °C
Sensor** subject to calibration	±0.1 °C
Total measuring system	±0.3 °C
Classification	The incubator complies with DIN-VDE 0750, Part 1, EN 60601-1, IEC 601-1 and IEC 601-2-19 Type B
Electromagnetic compability (EMC)	according to EN 60601-1-2
BabyLink Incubator (optional)	serial interface for output of incubator data (actual values, set values, alarms)
ThermoMonitoring (optional)	2nd skin temperature sensors to display peripheral skin temperature.
Dimensions	
(width x depth) mm	960 x 680
height in mm	1325 to 1525
Weight	89 kg

* applies only in Germany

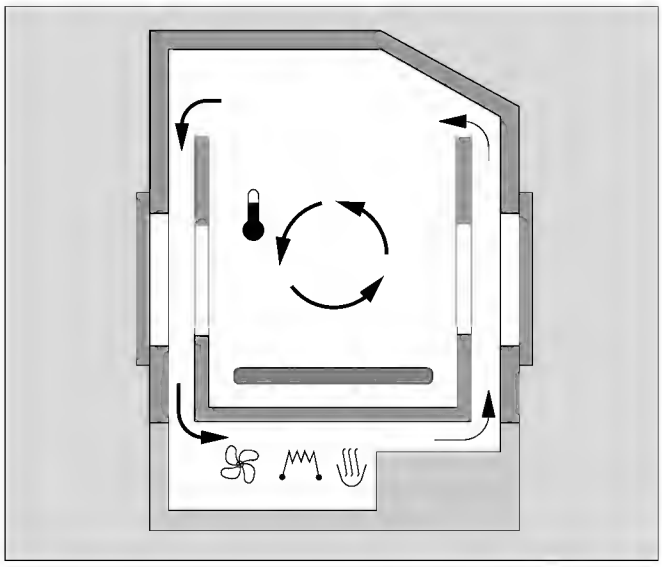
** or certified sensor with the same characteristic (400 Series, 2252 Ω @ 25 °C)

Description

Design

The heated and humidified air flows over the entire front face into the canopy. It is channelled up over the front door, along the roof of the canopy and then drawn down past the back wall by means of an extraction system. The baby lies in a still area with very little air flow. Heat loss is due to convection is minimized.
When the hand ports are open, there is still an effective hot air curtain which minimises cooling inside the incubator.

The mattress is made of soft foam plastic encased in film, ensuring a very low conductive heat loss.



Air Humidity

The humidity of the incubator air is controlled at the set value. The incubator air is humidified hygienically by the evaporation of water from a water supply.

Control

The incubator is controlled by a microprocessor. When it is switched on, and every 10 minutes thereafter, the incubator automatically carries out a self-test. This test checks all modules which are particularly important for safety.

The heating system is switched off automatically if operating conditions are outside permitted limits.

An additional fan cools the air rapidly as soon as the actual value of the air temperature exceeds the set value.

Safety features

When it is switched on, the incubator carries out a self-test to check all memories in the microprocessor control system and to establish that the various program segments are running correctly.

Actuators, acknowledgement signals and displays are switched on and off to check that they are functioning correctly. This test is also repeated every 10 minutes during operation. All modules installed in the incubator are tested. An Error message may be given for a faulty module, even if it is switched off.

Alarm hierarchy

The incubator has a hierarchical system of alarms. Any faults which occur are signalled in order of importance. If a non-essential function fails, the functions which are of vital importance remain in operation.

Continuous tone
cannot be suppressed, for faults which entail the greatest potential danger:
- Malfunction of incubator (Inop.)
- Malfunction in a module
- Mains power failure
- "Air temperature sensor" alarm
- "Fan failure" alarm.
- "O_2 sensor" alarm
- "Humidity sensor" alarm

Intermittend tone
can be suppressed for 10 minutes, for faults which entail a less serious potential danger:
- Deviations from set values
- Air temperature too high
- Water shortage
- "Skin temperature sensor" alarm

In addition, the relevant alarm LEDs flash.

Each alarm is shown by the central alarm LED so that a visual signal is given even when the flap with brief instructions is folded up.

If another alarm occurs when the alarm tone has already been suppressed, the tone is automatically re-activated. Depending on what the fault is, this alarm tone may also be suppressed. The period before the first alarm tone is automatically re-activated and is then prolonged by the time of the interval between the two alarms.

Ergonomics

The working height can be electrically adjusted to suit individual users.

The hand ports are oval in shape to allow optimum freedom of movement with a small cross-sectional opening.

The incubator has rotating castors so that it can be moved around easily. Two of the castors can be locked in position.

Ancillary equipment can be attached to the side rails.

A swivel cupboard is provided for storage purposes.

Hygiene

All parts of the incubator which come into contact with the gas breathed by the baby can be removed from the basic unit for disinfecting.

Order List

Name and Description	Order No.
Basic unit	
Incubator 8000 IC with control of air temperature and humidity O_2 control, height adjustment and swivel cupboard	FR 00 054
Optional	
Skin temperature control	
Canopy with horizontally divided front door	
BabyLink incubator interface	
ThermoMonitoring	
ThermoView	
Accessories	
Additional swivel cupboard with storage drawer	2M 20 638
Storage drawer for swivel cupboard	2M 20 642
Mounting set for unit	2M 20 656
Pillar, ø 38 mm, to be mounted on incubator housing	2M 21 380
Swivel table for attachment to pillar	2M 21 186
Infusion stand for attachment to pillar	2M 21 514
To be fitted to rail:	
Infusion stand	2M 16 520
Instrument tray (20 x 30 cm), maximum load 2 kg	M 24 678
Mounting plate, maximum load 20 kg	2M 19 460
Vacuum mattress	2M 16 920
Electronic "Seca Inscale" baby scales	2M 22 150
BabyLink incubator modification set	82 90 607
Medi-Cable, required to connect peripheral equipment	83 06 488
BabyScreen	2M 21 707
ThermoView	2M 21 888

Name and Description	Order No.
Photo-Therapy 4000	2M 21 000
Trolley for phototherapy unit	2M 21 190
Bronchial suction:	
A: Connection casing with rail clamp, O_2/Air	2M 85 006
B: Aspiration ejector; –0.5 bar	M 26 981
C: Bacterial filter 767 St, 5 ea	67 23 976
D: Vacuum regulator, –1 bar, rail	2M 85 583
E: Jar set	2M 85 056
F: Set wall holder (for mounting at trolley)	2M 85 010
G: Support for fitting on rail	2M 85 119
Combination A + B + E + F A + D + E + F A + B + C + E + G	2M 85 045
O_2/Air hose, 1.5 m	M 29 283
O_2/Air hose, 3 m	M 29 243
O_2/Air hose, 5 m	M 29 263
Vacuum hose, 1.5 m	M 29 287
Vacuum hose, 3 m	M 29 247
Vacuum hose, 5 m	M 29 267
O_2 flowmeter, 0 to15 L/min with connector and silicone hose	2M 19 510
O_2 hose, 1.5 m	M 29 271
O_2 hose, 3 m	M 29 231
O_2 hose, 5 m	M 29 251
O_2 limiter (only used with flowmeter)	2M 16 010
O_2 head box	2M 19 250
Support for ventilation hoses	84 11 075
Oxydig, O_2 monitor, including sensor capsule	83 04 411
O_2 monitor holder for incubators	2M 17 770
O_2 distributor, for gas from a medical gas pipeline system with clamp	2M 18 810

Name and Description	Order no.
Spare parts	
Air filter	84 02 926
Mattress	2M 20 907
Set of hand port doors, right and left	2M 19 550
Seal for left hand port opening	2M 19 469
Seal for right hand port opening	2M 19 470
Hose seal	2M 19 511
Seal for support bracket in trough	2M 19 595
Water container, with cover and hose	2M 20 644
Infusion bottle, empty	13 40 697
Sealing ring for infusion bottle socket	2M 16 045
Connecting hose	2M 20 464
Bottle holder	2M 19 561
Screws to secure the bottle holder	2M 06 004
Skin temperature sensor, not calibrated pack of 10	2M 21 726
Skin temperature sensor, calibrated, pack of 10	2M 22 010
Skin temperature sensor, calibrated, pack of 20, including 20 adhesive pads	2M 20 737
Skin temperature sensor, yellow, calibrated, pack of 10	2M 21 943
Skin temperature sensor, yellow, not calibrated, pack of 10	2M 21 916
Skin temperature sensor, white, calibrated, pack of 10	2M 21 942
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These Instructions for Use apply only to **Incubator 8000 IC** (FR 00 054) with Serial No.:

If no Serial No. has been filled in by Dräger these Instructions for Use are provided for general information only and are not intended for use with any specific machine or device.

CE

This device conforms to Directive 89/336/EEC (Directive on Electromagnetic Compatibility EMC).

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